DOCUMENT RESUME

ED 436 701 CG 029 697

AUTHOR	Greenfield, Lawrence; Tang, Beth Archibald
TITLE	Methadone Treatment: Overview and Bibliography.
INSTITUTION	Caliber Associates, Fairfax, VA.; National Evaluation Data Services, Rockville, MD.
SPONS AGENCY	Substance Abuse and Mental Health Services Administration (DHHS/PHS), Rockville, MD. Center for Substance Abuse Treatment.
PUB DATE	1999-07-00
NOTE	80p.
CONTRACT	270-97-7016
AVAILABLE FROM	Caliber Assoc., 10530 Rosehaven St., Suite 400, Fairfax, VA 22030; Tel: 703-385-3200; Tel: 800-763-3822 (Toll Free); Fax: 703-385-3206; Web site: <http://neds.calib.com>; e-mail: neds@calib.com
PUB TYPE	Information Analyses (070) -- Reference Materials - Bibliographies (131)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Acquired Immune Deficiency Syndrome; Alcoholism; Bibliographies; Counseling; *Drug Abuse; Evaluation; Pregnancy; Resources
IDENTIFIERS	Criminal Justice; Dual Diagnosis; *Methadone

ABSTRACT

This overview focuses on methadone treatment. Briefly, it describes the clinical uses of methadone for substance abuse treatment, explores dosage guidelines, and discusses counseling components. This overview also reviews research data on the application of methadone treatment to special populations, such as pregnant women, polydrug users, and patients with HIV/AIDS or coexisting disorders. It also discusses and charts a number of representative outcome evaluation studies, which are frequently cited in the literature. Supporting bibliographies focus on the various topics mentioned above. The citations and references were obtained from database searches, personal communication with Dr. Herman Joseph, recommendations from the professional staff at Caliber Associates, and through backtracking references in articles. The "Other Resources" section highlights online documents and related Internet sites for further information. (Contains 62 references.) (MKA)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 436 701

NEDS

NATIONAL EVALUATION DATA SERVICES

METHADONE TREATMENT" OVERVIEW AND BIBLIOGRAPHY

Prepared by
Lawrence Greenfield, Ph.D.
Beth Archibald Tang

Caliber Associates
10530 Rosehaven Street, Suite 400
Fairfax, VA 22030

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

July 1999

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
R. FINKBINER

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CG029697

BEST COPY AVAILABLE

This document was supported by the Center for Substance Abuse Treatment, Department of Health and Human Services, Caliber/NEDS Contract No. 270-97-7016.

CSAT
Center for Substance
Abuse Treatment
SAMHSA

TABLE OF CONTENTS

Page

FOREWORD i

I. METHADONE TREATMENT OVERVIEW

1. INTRODUCTION 1
2. TREATMENT 4
3. SPECIAL POPULATIONS 6
4. EVALUATION 9
5. MATERIALS FOLLOWING OVERVIEW 15
6. REFERENCES 16

II. METHADONE TREATMENT BIBLIOGRAPHIES 22

1. INTRODUCTORY READING 23
2. TREATMENT
   - 2.1 Counseling 32
   - 2.2 Dosage 37
3. SPECIAL POPULATIONS
   - 3.1 Alcohol 43
   - 3.2 Criminal Justice 46
   - 3.3 Dually Diagnosed Patients 50
   - 3.4 HIV/AIDS 53
   - 3.5 Polydrug Users 55
   - 3.6 Pregnancy 60
4. EVALUATION 64
5. OTHER RESOURCES 74

FOREWORD

One of the missions of the Center for Substance Abuse Treatment (CSAT) is to enhance the nation's substance abuse treatment system by identifying, developing, and supporting appropriate policies, approaches, and programs. In short, for the field of substance abuse treatment, CSAT seeks to determine what works for whom and at what cost.

Building knowledge through evaluation is the key to answering these questions. From CSAT's perspective, evaluation is an integral component of program management and part of an ongoing process of knowledge development, assessment, and improvement. Toward this end, CSAT's Program Evaluation Branch (PEB) established the National Evaluation Data Service (NEDS) to advance state-of-the-art evaluation in the field of substance abuse.

This overview and annotated bibliography lists books, articles, and research studies that focus on assessing the effectiveness of program services and benefits to clients in methadone treatment programs. We hope this document will assist professionals within the substance abuse treatment community with their ongoing determination of effective program services.

This overview and bibliography was developed under the guidance of Ron Smith, Ph.D., Government Project Officer. We wish to thank Michael Maranda, Ph.D., and Richard Finkbiner, Ph.D., for their guidance, and Herman Joseph, Ph.D., for his assistance. Beth Archibald Tang, M.A., and Lawrence Greenfield, Ph.D. wrote the overview and compiled this bibliography with the assistance of Tracey Fenwick.

Sharon Bishop
Project Director
National Evaluation Data Service

I. METHADONE TREATMENT OVERVIEW

This overview focuses on methadone treatment. Briefly, it describes the clinical uses of methadone for substance abuse treatment, explores dosage guidelines, and discusses counseling components. This overview also reviews research data on the application of methadone treatment to special populations, such as pregnant women, polydrug users, and patients with HIV/AIDS or coexisting disorders. Then we discuss and chart a number of representative outcome evaluation studies, which are frequently cited in the literature. Supporting bibliographies focus on the various topics mentioned above. The citations and references were obtained from database searches[1], personal communication with Dr. Herman Joseph, recommendations from the professional staff at Caliber Associates, and through backtracking references in articles. The "Other Resources" section highlights online documents and related Internet sites for further information.

1. INTRODUCTION

Methadone (methadone hydrochloride), a synthetic analgesic, was developed during World War II in Germany as an alternative to morphine for pain relief[2]. Since the mid-1960s, it has been used in the provision of treatment to individuals with heroin and other opiate addictions. The National Drug and Alcoholism Treatment Unit Survey (NDATUS) reports that about 100,000 clients received methadone in 1991 (Substance Abuse and Mental Health Services Administration, 1993) in the United States, accounting for about half of all patients in methadone treatment worldwide (Lowinson, Marion, Joseph, & Dole, 1992). A more recent publication (Office of National Drug Control Policy), citing a survey by the American Methadone Treatment Association, puts the number of U.S. clients receiving methadone at 170,000.

The potential uses of methadone as a drug treatment therapy were discovered by Dole and Nyswander (1965) serendipitously when they noted methadone's utility for stabilizing the clinical states of six long-term users of heroin so that the patients were able to function normally with no mood swings. In sufficient dosages, methadone was observed to block "the narcotic effects of normal street doses of short-acting narcotics" (Lowinson, Payte, Salsitz, Joseph,

---

[1] Databases include Dialog, the Project Cork Institute database on the Dartmouth College Library Online System, and the Information about Drugs and Alcohol (IDA) database at the National Clearinghouse for Alcohol and Drug Information, as well the substance abuse treatment program evaluation collection housed at the NEDS Resource Center.

[2] Methadone is not an opiate; it is, however, an opioid. Opioids are a class of drugs that include synthetic drugs that behave like opiates, such as methadone, as well as the opiates, such as heroin, which are derived from opium.

Marion, & Dole, 1997) and to reduce cravings. A few years later, Kreek (1973) described the physiologic mechanisms of methadone in the body. Dole (1994) explains:

> A fortunate accident...explains why the unique value of methadone for maintenance had not been discovered previously. The [six] patients had just completed a long series of tests with other opiates and, as a consequence, had developed a high tolerance to narcotics. Therefore, methadone was administered in exceptionally high doses, about ten times greater than is needed for analgesic action in naive patients.... [W]hen large doses of methadone have been administered repeatedly,...the nonspecific binding sites come into equilibrium with a pharmacologically effective concentration in circulating blood.

More recently, methadone maintenance has been used to manage another health problem associated with the injection of opiates—namely, HIV infection (Joseph & Appel, 1993). Dennis and colleagues (1994) have supported increasing the availability of methadone treatment to all addicts who desire it, and treatment on demand has become a national issue for addressing the HIV/AIDS epidemic.

Novick and colleagues (1990) conducted a long-term study of socially rehabilitated methadone maintenance patients who entered treatment concurrent with the start of the HIV infection epidemic. The authors found that patients who had previously engaged in high-risk practices (needle sharing, use of shooting galleries, sexual contact with other drug abusers) had not developed antibodies to HIV, and neither had their spouses or children, suggesting that methadone maintenance was effective for harm reduction.

Methadone maintenance as a harm reduction approach supports the goal of reducing high-risk behaviors that can lead to HIV infection and other related medical conditions. This public health approach holds that safer drug use is possible within groups of addicted people for whom total abstinence is not a realizable goal (Drucker, 1995). Stimson (1996) stated in an editorial that the harm reduction strategy for HIV infection among injection drug users in the United Kingdom has been a great success. Methadone treatment is an important component of this strategy because in reducing intravenous heroin use, methadone treatment reduces the risk of contracting or transmitting HIV through the sharing of unclean injection equipment. In responding to the editorial, Des Jarlais (1996) acknowledged the success of the British approach in reducing the spread of HIV infection among injection drug users, but notes that "successful HIV prevention programs do not eliminate risk behavior" and that continued intervention needs to be maintained.

Methadone is utilized for short-term and long-term detoxification[3], as well as for maintenance therapy. The goal of maintenance is to make a person remain on methadone for as long as they require it to lead a stable life. In some cases it may be the rest of his or her life. The Food and Drug Administration (FDA) defines the length of time for short-term detoxification as up to 30 days; the period for long-term detoxification ranges from more than 30 days to less than 180 days (21 CFR 291.505). The provision of methadone for 180 days or more is defined by the FDA as maintenance. Some programs, which technically are maintenance programs by the FDA's definition, espouse the goal of abstinence and can best be described as very long-term detoxification programs or "methadone-to-abstinence" (MTA) programs.

While the use of methadone for detoxification is well accepted, controversy surrounds the concept of long-term or life-long maintenance. Szasz (1994), for example, argues that drug abuse treatment is a moral and political problem, not a medical problem. Many treatment professionals and members of the general public object on philosophical grounds to the substitution of a long-acting opioid (methadone) for a short-acting opioid (heroin). According to these critics (so-called "methaphobes" [Scro, 1995]), the use of methadone is only acceptable if there is a clearly specified goal of abstinence. Cushman (1981) and others (Joseph, 1994; Newman, 1991) discussed these controversies in the attempt to dispel some misconceptions surrounding the use of methadone as a long-term maintenance regimen. Experience shows that long-term heroin addicts who leave methadone treatment have very high rates of relapse within one year (e.g., Ball, & Ross, 1991), suggesting that the goal of abstinence may be unattainable for some portion of the addicted population.

Another concern about methadone is its diversion on the black market. In the United States, methadone is formulated for oral consumption in methadone detoxification and maintenance programs in order to prevent its diversion to injection use. Nadelmann and McNeely (1996), however, found that "the illicit market in methadone is the predictable result of insufficient methadone availability." The authors continued that methadone is "simply not a drug of choice"; that is, since some local regulations limit dosages and some providers underdose, the diverted methadone most likely will be utilized by individuals who are unable to enter methadone treatment for various reasons and are attempting to "treat" themselves.

---

[3] Technically, a patient is not detoxified from opioids; that is, poisons are not removed from the patient's body. Withdrawal symptoms are the result of the sudden removal of opioids after the body's habituation to them. Detoxification, in this sense, is the supervised withdrawal from opioids; an opioid replacement, usually methadone, is given to the patient in a dosage sufficient to block the withdrawal symptoms. Then, the dosage is gradually reduced to allow the patient's body to adjust to a narcotic-free state.

Since the early 1990s, another synthetic analgesic, LAAM (levo-alpha-acetylmethadol), has gained favor in treatment communities and legal status with the Federal government as an opiate treatment option. The advantage of LAAM over methadone is that, while the therapeutic effects of methadone last for up to 36 hours, the effects of LAAM last for up to 72 hours (McArthur & Goldsberry, 1994). Another benefit of LAAM is its lower overall cost. LAAM's longer action makes it possible for clients to visit the clinic less often (i.e., every two to three days) without take-home dosages. A recent study comparing the costs of methadone versus LAAM found that LAAM is two to four times more expensive than methadone, but the costs would be lower since LAAM would be dispensed less often (Capital Consulting Corporation & The Lewin Group, 1996).

2. TREATMENT

Methadone treatment is designed to help persons recover from an addiction life style. Thus, methadone treatment involves more than just providing patients with a regular dose of methadone. While the main service of dispensing methadone addresses the immediate need for stabilization, concurrent problems that interfere with treatment progress (e.g., polydrug use) are treated with ancillary or counseling services, which are discussed in more detail below.

Dosage. The amount of methadone to be dispensed depends on the goal of administration—detoxification or maintenance therapy. While the effectiveness of a dose of methadone is understood, dosage is not without controversy. Some practitioners and researchers have deviated from Dole and Nyswander's original protocols, on occasion dispensing lower dosages in the belief that less diversion would occur. Patients may also be resistant to increased dosages for fear of unsubstantiated side effects (Lowinson et al., 1997). Exhibit I-1 below outlines the Center for Substance Abuse Treatment's recommended dosage for methadone maintenance therapy (Payte & Khuri, 1993).

EXHIBIT I-1
RECOMMENDED DOSE RANGES OVER THE COURSE OF TREATMENT

PHASE	PURPOSE	RANGE
Initial dose	Relieve abstinence symptoms	20 to 40 mg
Early induction	Reach tolerance threshold	Initial dose of ± 5 to 10 mg (every 3 to 24 hours)
Late induction	Establish adequate dose (desired effects)	Initial dose of ± 5 to 10 mg (every 5 to 10 days)
Maintenance	Maintain desired effects (steady-state occupation opiate receptors)	Usually 80 ± 20 mg (may be <100 mg or >60 mg)

Payte and Khuri (1993),recommend that treatment sites should:

> Provide methadone doses that are enough to produce the desired response in the patient for the desired duration of time, with an allowance for a margin of effectiveness and safety. The majority of patients will ultimately fall into a range of effective doses, with the low end of the range being about 50 mg and the high end about 120 mg; for most patients, the effective dose is likely to be about 80 mg, plus or minus 20 mg.

Underdosed patients may complain of flu-like symptoms and excessive tiredness. When they experience a dosage slightly higher than normal i.e. their daily administered dose, they may experience a sense of well being, or "abnormal normality." As the effect wears off, patients may experience a normal state that is, in reality, a full awareness of their physiological condition (i.e., normal aches and pains) and they may be convinced of a nonexistent illness (Payte & Khuri, 1993).

Counseling. Drug counseling in all its variations should work toward decreased illicit drug use and improved life changes. Therapeutic components usually address drug use, social and family relationships, health problems, and educational or vocational issues. Under current discussion by CSAT is a counseling model for cocaine abusers in methadone therapy. The Matrix model utilizes stages of recovery from cocaine dependence (Rawson, Obert, McCann, & Ling, 1990) and offers patients prevention techniques to address problems of abstinence and relapse. Magura and colleagues (1994) observed that 60 percent of the patients who attended the majority of sessions of a modified version of the Matrix model significantly reduced their cocaine use.

Drug counselors provide screening and help patients with current problems. Often they function as case managers and coordinate treatment with agencies or offices. Drug counselors, however, are not psychotherapists (Zweben, 1993); they cannot diagnose psychiatric disorders or provide psychotherapy. Ball and Corty (1988) emphasize that counselors "provide the daily contact as well as most of the individual care and rehabilitative services that patients receive." They further explain that, "although the counselor's principal roles [are] individual face-to-face conferences, daily monitoring with brief contacts, attendance checks, and referrals," the more qualified counselors also provide additional services. These additional services include 12-step groups at the clinic, family therapy, educational services, and vocational services. Unfortunately, the "staff qualified to provide the additional services were not available in most programs" (Ball & Corty, 1988).

3. SPECIAL POPULATIONS

It is imperative that methadone treatment program staff and professionals be prepared to address the various concerns and issues of special populations, such as those patients who are involved with the criminal justice system. Some patients may present with medical problems such as mental illness, HIV/AIDS, pregnancy, alcohol or other non-opioid drug use, or pain management.

Psychiatric comorbidity. According to the Kaplan, Sadoc and Grebb (1994) manual on psychiatry, about 90 percent of opioid dependent persons (whether in substance abuse treatment or not) have an additional psychiatric diagnosis. The most common comorbid psychiatric diagnoses are major depressive disorder, alcohol-related disorder, antisocial personality disorder (ASPD) and anxiety disorder. Brooner et al. (1997) assessed psychiatric comorbidity in 716 opioid abusers seeking methadone treatment. Psychiatric comorbidity was documented in 47 percent of the sample, most commonly ASPD (25.1%) and major depression (15.8%). Milby et al. (1996) examined prevalence rates for DSM-III-R anxiety and affective disorders among follow-up samples of opioid addicts who were treated with methadone maintenance. At least one anxiety disorder was diagnosed in 55 percent of patients/addicts. Affective disorders were found in 58 percent and both disorders were diagnosed in 36 percent of the sample. In addition to high prevalency rates for both males and females, Magura et al. (1998a) found gender differences in patterns of comorbidity for a sample of 212 methadone patients who were dually addicted to heroin and cocaine. Women were more likely to present with concurrent mood and anxiety disorders. Women with ASPD were likely to have a continuing opioid use disorder despite having been in methadone treatment for a mean of 31 months at the time of the study. Men with anxiety disorder were more likely to have ASPD, making them more difficult to treat than others without ASPD. The co-occurrence of ASPD and intravenous drug use has been linked to poor treatment outcomes. According to Gerstley, et al., (1990), however, much of what has been concluded concerning the poorer treatment response of antisocial substance abusers appears to be based on indirect evidence of the greater severity of their addiction and that the presence of ASPD or any other psychiatric diagnosis in substance abusers is associated with poorer treatment outcomes. The association of ASPD with treatment outcome, may in fact be moderated by the presence of additional psychiatric symptomology. Woody et al., (1985), for example, found that a group of substance abusers diagnosed with ASPD, who also met the criteria for a lifetime diagnosis of depression, benefited from individual psychotherapy, whereas a group diagnosed with ASPD only had no such benefit.

Criminal justice. Treating methadone patients involved with the criminal justice system is difficult because many of them are caught in cycles of relapse (Magura, Rosenblum, & Joseph, 1992) and "predatory illegal acts" (Hubbard, Collins, Rachal, & Cavanaugh, 1988). Joseph and Woods (1995) found that "socially dysfunctional patients may have higher arrest rates both prior to and during treatment and lower retention rates than more socially stable patients." While there is agreement on the co-occurrence of addiction and crime, the literature appears to conflict on whether developmentally the addiction precedes the commission of crimes, or vice versa. Nurco et al., (1993) for example, found that the subsequent level of involvement in crime was associated with early onset, i.e., by age 11, of opiate addiction. Barthwell and Gastfriend, (1993), on the other hand, suggest that methadone patients with ASPD "exhibit disordered conduct early in life that precedes drug problems, and they progress to multiple substance abuse and dependence as a consequence of their aggressive, impulsive, antisocial behavior." Different prevention and treatment strategies are suggested by these alternatives.

HIV/AIDS. In some cases, patients who present for methadone treatment may have little or no previous contact with health professionals. Moreover, persons with HIV infection presenting for treatment may be more ill and need more medical and counseling services, such as services to educate them about the management of their illness to avoid HIV/AIDS exposure to others than patients without HIV infection. As AIDS has been recognized as a public health issue, methadone treatment in conjunction with appropriate ancillary counseling has been recognized as effective. To illustrate this point, Metzger et al., (1993) reported on a prospective study of 152 in-treatment (methadone) and 103 out-of-treatment intravenous opiate users. Subjects were interviewed at baseline and at 6 month intervals for a period of 18 months. HIV seroprevalence at baseline was 12 percent overall, including 10 percent for the methadone maintained and 16 percent for the out-of-treatment group. Follow-up with HIV-negative subjects over the next 18 months revealed a sixfold difference in rate of seroconversion between the two groups, with the methadone maintained subjects experiencing the lower rates. Out-of-treatment subjects were injecting drugs, sharing needles, visiting shooting galleries, and practicing unsafe sex at significantly higher rates than in-treatment subjects. For further reading, refer to Neshin (1993), who describes counseling and testing for HIV and other infectious diseases. Magura et al., (1998b) found a reduction in injection frequency use and needle sharing risk for a sample of opiate addicted in-treatment cocaine users in methadone treatment. The protective effect of methadone treatment may be moderated by the presence of psychiatric factors, particularly ASPD (Brooner et al., 1993). Brooner et al., found significant differences between the infection rates of non-treatment and treatment samples of intravenous drug users. However, in each sample, the patients with ASPD diagnoses had significantly higher rates of infection. These authors suggested that the psychiatric characterization of subjects be included in evaluating the risk for HIV infection.

Pregnancy. Another health-related issue is that of methadone treatment during pregnancy. It is problematic because of the lack of clear dosing protocols, the severe nature of neonatal withdrawal, and the uncertain outcomes of infants exposed to methadone *in utero*. Indicators of pregnancy such as nausea and cramps may be interpreted as withdrawal symptoms, which may further complicate the treatment process (Kaltenbach, Silverman, & Wapner, 1993). Methadone treatment, however, may discourage the use of illicit opiates and other drugs by the pregnant patient and thus be beneficial to both the fetus and the mother.

Use of alcohol and other drugs. Patients' use of alcohol or other non-opioid drugs during methadone therapy requires additional levels of counseling and ancillary services. For example, a new model used to counsel cocaine-using patients in methadone therapy, the Matrix model, is under study (see *Counseling*, above). Chatham and colleagues, (1997), report on the outcomes at follow-up for two groups of clients who were classified at admission as being alcohol-dependent or nondependent. The authors found that it was important to distinguish the different types of drinking by clients; failure to do so may have accounted for inconsistencies in the findings of previous studies concerning the role of alcohol consumption in methadone therapy. While the alcohol-dependent group had more factors (e.g., depression and low self-esteem), these clients stayed in treatment much longer than did the alcohol nondependent group because the former were more aware of their alcohol problem and attended more self-help meetings than the latter.

Pain management. In cases of acute pain management or the need for anesthesia prior to surgery, health care providers treating methadone patients should take care in the administration of anesthesia because of possible drug interactions. Possible drug interactions include shock, respiratory depression, respiratory arrest, circulatory depression, and cardiac arrest (*Methadone Hydrochloride*, 1997). Ebert and Ganser (1997) stress that "anaesthetic management" should not interfere with the special conditions of substance-abusing patients. For example, Kennedy and Crowley (1988) conducted a study of chronic pain management in patients addicted to narcotics with a history of substance abuse. The authors concluded that, even though results were mixed, patients can be "attracted" and "some patients will remain" in the chronic pain management treatment program.

4. EVALUATION

With the recent emphasis on substantiating outcomes, it is important to evaluate how certain variables affect methadone therapy programs. Ball and Corty (1988) found that "all of the major treatment modalities for heroin addicts are successful for some patients." They concluded that "methadone maintenance can be effective, especially with respect to reducing illicit drug use and crime. The question remains, however, as to which types of patients can (and cannot) be treated successfully." An adequate definition of "successful treatment" may be difficult, then, to specify operationally. Changes in the case mix further complicate evaluations of treatment effectiveness. Hubbard and colleagues (1989) observed that because of changes in the nature of client populations in methadone treatment programs (from a larger proportion of older males who were black or Hispanic to a larger proportion of older females who were white), "treatment regimens directed toward the abuser of specific drugs" will not be as effective as treatment directed toward an increasingly heterogeneous group of clients.

Joseph (1994a) explains that "the major findings of follow-up studies of discharged methadone patients in the United States and Europe have found that a large majority are unable to maintain abstinence and eventually relapse." A 1990 General Accounting Office (GAO) report confirms that additional oversight in methadone maintenance is necessary to identify and implement effective treatment practices.

To illustrate the evaluation of treatment effectiveness, Exhibit I-2 highlights selected outcomes from representative evaluation studies. Ball and Corty (1988) emphasize that "treatment effectiveness is not a matter of success or failure, but a question of how much improvement, for how many patients, over how much time." Ball and Ross (1991) demonstrated the interaction between treatment- or program-level variables and patient characteristics in assessing treatment effectiveness. Large multisite evaluations over several decades by Simpson and Sells (1990) with the Drug Alcohol Reporting Program, Hubbard et al. (1989) with the Treatment Outcome Perspective Study (TOPS), and Hubbard et al. (1997) with the Drug Abuse Treatment Outcome Study consistently showed the importance of length of stay in treatment in attaining treatment success. Magura and colleagues (1994) observed that of the patients who participated in the 6-month modified Matrix model enhanced treatment, those who attended more sessions had less cocaine use at 6-month follow-up.

EXHIBIT I-2
SELECTED OUTCOME EVALUATION FINDINGS

CITATION	POPULATION	STUDY QUESTION	FINDINGS
Ball & Ross, 1991	Patients in methadone maintenance treatment, N=600	How effective is methadone maintenance treatment?	Initial and follow-up interview data collected from N=506 Patients from 6 programs in New York, Philadelphia and Baltimore. N=399 patients still in treatment at follow-up and N=107 dropouts were interviewed. Instruments were ASI plus supplementary questions about crime and IV drug use. Program level data were also collected including 1) a facility survey, 2) operations data 3) staff interviews, 4) urinalysis records, 5) services data. Five outcomes were assessed: Past 30 day use of heroin, cocaine, any opiates or cocaine, recency of IV drug use, and days with criminal activity in past 30. Patient, program and process variables were each associated with one or more outcomes. Two program components were each associated with all outcomes. The first, COUNS-DIR-POL, represents counseling service, an effective director, and a maintenance orientation, and the second, MED, represents the adequacy of medical services.
Simpson & Sells, 1990	12-year post-treatment follow-up interviews with N=490 opiod addicts in abuse treatment from 1969 - 1972 under Drug Abuse Reporting Program (DARP). *Note: Other treatment modalities were included in the study but only the outpatient methadone treatment (OMT) modality is reviewed here.*	What are the long term patterns of drug use and non-use following substance abuse treatment?	Daily opioid use declined from 100 percent pre-DARP to 26 percent in year 12 post-DARP; Any opiod use declined from 100 percent pre-DARP to a low of 38 percent in year 12 post-DARP; Marijuana and alcohol use increased over the same period; Any employment increased from 64 percent pre-DARP to 70 percent in year 12 post-DARP; Any arrests declined from 83 percent pre-DARP to 12 percent year 12 post-DARP; Any jail or prison time declined from 67 percent pre-DARP to 26 percent in year 12 post-DARP. By year 12 post-DARP, 74 percent had relapsed one or more times. Relapse was most likely in first 3 months post- DARP.

BEST COPY AVAILABLE

EXHIBIT I-2 (CONTINUED)
SELECTED OUTCOME EVALUATION FINDINGS

CITATION	POPULATION	STUDY QUESTION	FINDINGS
Hubbard et al. 1989	Follow-up interviews with N=1,539 former methadone treatment clients in the Treatment Outcomes Perspective Study (TOPS) 1979-1981 Cohort. *Note: Other treatment modalities were included in the study but only the OMT modality is reviewed here.*	How effective is drug abuse treatment in reducing drug use and restoring people's lives? Data were assessed over a five year period.	Decreases in daily or weekly (regular) use of heroin, cocaine, marijuana, and psychotherapeutic drugs were found for the three modalities between the pre-intake and each follow-up period, i.e., 3 months in treatment, 3-month follow-up, 1-year follow-up, 2 year follow-up and 3 to 5-year follow-up. Longer stays in treatment were associated with reduced drug use but not other behaviors. For clients treated for 3+ months, consistent pre-treatment to post-treatment reductions were found for intravenous drug use and criminal activities. Changes in employment were relatively small and inconsistent across time periods. A logistic regression analysis (LR) was completed for N=835 methadone treatment clients. Long term maintenance clients had 5 times lower odds of regular heroin use than clients with less than 1 week of treatment, 2 times lower odds of heavy alcohol use and 3 times lower odds of involvement in predatory illegal acts.
Hubbard et al., 1997	The Drug Abuse Treatment Outcome Perspective Study (DATOS), N=1,203 OMT patients in pre-admission year and N=727 in follow-up year. *Note: Other treatment modalities were included in the study but only the OMT modality is reviewed here.*	What are the 1-year follow-up and pre-admission differences in drug use and behaviors? Are drug use and other behaviors in the follow-up year associated with duration of treatment?	Reductions at 1-year follow-up were found in weekly heroin and cocaine use. No difference was found between groups retained for different durations in the percentage reductions of drug and alcohol use. Using logistic regression, the *still in treatment*, *> 6 months* (in treatment) and *3-6 months* were compared to the < *than 3 months* group. The *still in treatment* group had a lower odds of weekly heroin (.24, p<.05) and marijuana use (.49, p<.05). The *>6 month*s group had lower odds of marijuana (.44, p<.05) and the 3-6 months group had a higher odds of heavy alcohol use (2.73, p<.05) and predatory illegal activity (3.11, p<.05).

BEST COPY AVAILABLE

EXHIBIT I-2 (CONTINUED)
SELECTED OUTCOME EVALUATION FINDINGS

CITATION	POPULATION	STUDY QUESTION	FINDINGS
Magura, Rosenblum, Lewis, & Joseph, 1993	Criminally involved addicts, N=446 (KEEP [Key Extended Entry Program] enrollees in the experimental group, N=308, were compared to a control group not enrolled in KEEP, N=138)	What is the long-term effectiveness of in-jail methadone maintenance for individuals who were on methadone prior to being arrested? How effective is it for those who began methadone in jail?	Program participants were more likely to enter treatment after release and still be in treatment after 6.5 months than were the controls. KEEP was most effective for those already enrolled in methadone treatment.
Magura et al., 1994	Cocaine-dependent methadone patients, N=77	Is a 6-month modified Matrix model enhanced treatment program effective for cocaine-using methadone patients?	61 percent of patients completed the 6-month cocaine regimen; frequency of drug injection declined by 39 percent; the percent of subjects achieving abstinence from cocaine during the 30-day interview period increased from 0 to 21 percent. Generally, the more sessions clients attended, the lower cocaine use at 6-month follow-up.
Hunt, Lipton and Spunt, 1984	N=368 methadone maintenance clients and N=142 narcotics addicts who are not currently in treatment	Do narcotics addicts reduce their criminal activity when they enter methadone maintenance treatment?	Methadone clients engaged in significantly lower amounts of property ($p<.1$) and drug dealing crimes ($p<.001$) than narcotics users not in treatment. Both groups had similar amounts of drug related arrests in the past (prior to treatment), but the methadone clients had higher average number of past personal and property crime arrests. With age differences controlled, the differences were no longer evident for all but the most criminally active clients, i.e., age 20-30. Thus, methadone clients are not different in their offender backgrounds from the untreated addicts. Unemployment and cocaine use were positively correlated with criminal activity among methadone clients.

BEST COPY AVAILABLE

EXHIBIT I-2 (CONTINUED)
SELECTED OUTCOME EVALUATION FINDINGS

CITATION	POPULATION	STUDY QUESTION	FINDINGS
Havassy and Tschann	N=29 methadone treated clients were randomly assigned to a program which administered an increasing methadone dose and N=25 were randomly assigned to a program which administered a stable methadone dose.	Does an increasing dose of methadone reduce opiate use in comparison to a stable methadone dose?	Clients receiving a dose increment did not reduce their illicit use of opiates. Clients receiving a stable dose decreased their rate of opiate abuse. The evidence pointed to the importance of program practices, which differed between the two programs. In addition to substantial increases in dose, it was concluded that the consequences of violating program rules need to be made clear and be consistently enforced. This principle was adhered to more closely in the stable dose program, where clients were administratively detoxified for repeated rule violations.
Bell, Chan and Kuk (1995)	Report is based on a 1986 study of (N=202) heroin users in Sydney, Australia. Clients were assessed at one clinic and referred for treatment either to a 'abstinence' oriented methadone clinic (N=141) or 'maintenance' oriented methadone clinic (N=61). Clinic 1 used contingency management, discharging clients after 3 positive urines. Clinic 2 accepted "a degree of drug use."	The key research question was whether clinic differences or dose differences better predict urine results? Although clients in 'maintenance' oriented treatment were expected to be retained longer, the clients in the 'abstinence' oriented clinic were expected to have less drug use, i.e., 'cleaner' urines.	The abstinence clinic had a higher percentage of positive urines (25% versus 18%) than the maintenance clinic. Positive urines were highly associated with methadone dose, e.g., a dose of 80 mg. was two times less likely to be associated with a positive urine than a dose of 40 mg. (OR=.55, 95% CI [.45,.68]). The lower average dose in Clinic 1 was consistent with its abstinence orientation. After adjusting for dose and for the fact that certain individuals tend to use heroin heavily, no difference was found in the risk of heroin use during maintenance treatment. The higher rates of heroin use in the abstinence-oriented clinic were attributable to time-limited treatment and the use of lower doses of methadone.

EXHIBIT I-2 (CONTINUED)
SELECTED OUTCOME EVALUATION FINDINGS

CITATION	POPULATION	STUDY QUESTION	FINDINGS
McLellan, Arndt, Metzger, Woody, & O'Brien, 1993	Male intravenous opiate users in methadone maintenance, N=92, who were randomly assigned to standard couseling (methadone only), standard plus minimal counseling, or enhanced.	Do counseling, medical care, and psychosocial service components improve the effectiveness of methadone therapy or is methadone alone sufficient to produce positive results?	The addition of basic counseling was associated with major increases of efficacy: 28 percent of the standard plus counseling group was able to maintain opiate-free urine for 16 weeks or more, compared to 0 percent for the standard group. The addition of onsite professional services was even more effective: 55 percent of the enhanced treatment group was able to maintain opiate-free urines for 16 weeks or more. Moreover, compared to the two other groups, the enhanced group showed significant improvement in employment status, AOD use and illegal activity, family relations, and psychiatric status.
Novick et al., 1990	Long-term socially rehabilitated methadone-maintained former heroin addicts, N=58; the duration of treatment was 16.9 ± 0.5 years.	Do HIV-negative parenteral drug abusers participating in methadone maintenance have reduced risks for HIV infection?	None of the subjects had an antibody to HIV but 91 percent had Hepatitis B markers. Of note, the former addicts had engaged in previous HIV high-risk practices and had entered treatment before or at the start of the HIV infection epidemic.
Saxon, Wells, Fleming, Jackson, & Calsyn, 1996	Patients newly admitted to methadone maintenance treatment, N=353; randomly assigned to three counseling conditions and two contingency conditions	What are the impacts of different approaches in methadone treatment, such as weekly urine toxicology, counseling (medication-only, standard, enhanced), and two contingency conditions (non-contingent, contingent; i.e., contingency contracts for drug usage) as predictors of methadone maintenance treatment outcome?	Older age, non-black race, lower ASI legal composite score, higher methadone dose level, and assignment to non-contingent conditions predicted treatment retention. Enhanced treatment with contingency contractions predicted less cocaine use.

EXHIBIT I-2 (CONTINUED)
SELECTED OUTCOME EVALUATION FINDINGS

CITATION	POPULATION	STUDY QUESTION	FINDINGS
Tunis, Delucchi, Schwartz, Banys, & Sees, 1995	Male and female patients recruited from a larger, 180-day study of psychosocial treatment, N=41	Do therapeutic and peer alliances influence treatment outcome for opioid addicts in an extended detoxification program?	Both alliance scales predicted whether or not the subject had used opioids other than methadone in the last 30 days. Counselor alliance scores averaged 125.5 for those subjects who had used opioids and 182.0 for those who had not; peer alliance scores averaged 51.1 for those who had used and 88.0 for those who had not.

For additional highlights from outcome evaluation studies, see Joseph (1994) and GAO (1996).

5. MATERIALS FOLLOWING OVERVIEW

The accompanying annotated bibliography provides further reading on the topics discussed in the overview. The first section covers general reading and introductory materials, the next section deals with dosage and related concerns. Subsequent sections discuss counseling components and special populations. Finally, the last section presents evaluations, including studies on long-term outcomes and retention. The "Other Resources" section lists various on-line references for additional information. All listings and reviews are for informational purposes only and should not be interpreted as an endorsement of any specific resource or publication.

6. REFERENCES

Ball, J. C., & Corty, E. (1988). Basic issues pertaining to the effectiveness of methadone maintenance treatment. In C. G. Leukefeld & F. M. Tims (Eds.), Compulsory treatment of drug abuse: Research and clinical practice (NIDA Research Monograph No. 86, pp. 178-191). Rockville, MD: National Institute on Drug Abuse.

Ball, J. C., & Ross, A. (1991). The effectiveness of methadone maintenance treatment: Patients, programs, services, and outcomes. New York: Springer-Verlag.

Brooner, R.K., Greenfield, L. Schmidt, C.W. Bigelow, G.E. (1993) Antisocial personality disorder and HIV infection in intravenous drug abusers. American Journal of Psychiatry, 150, 53-58.

Brooner, R., King, V., Kidorf, M., Schmidt, C., & Bigelow, G. (1997). Psychiatric and substance use comorbidity among treatment-seeking opioid abusers. Archives of General Psychiatry, 54(1), 71-80.

Barthwell, A., & Gastfriend, D. A. (1993). Treating multiple substance abuse. In Parrino, M. W. (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 73-84). Rockville, MD: Center for Substance Abuse Treatment.

Capital Consulting Corporation & The Lewin Group. (1996). Methadone and LAAM: An analysis of the cost of treatment using alternative medications for opiate addiction. Fairfax, VA: National Evaluation Data and Technical Assistance Center.

Chatham, L. R., Rowan-Szal, G. A., Joe, G. W., & Simpson, D. D. (1997). Heavy drinking, alcohol-dependent vs. nondependent methadone maintenance clients: A follow-up study. Addictive Behaviors, 22, 69-80.

Comprehensive Drug Abuse Prevention and Control Act, 21 CFR 291.505 (1998, April, rev.).

Cushman, P. (1981). Detoxification after methadone maintenance treatment. In R. B. Millman, P. Cushman, & J. H. Lowinson (Eds.), Research developments in drug and alcohol use: Annals of the New York Academy of Sciences (Volume 362, pp. 217-230). New York: New York Academy of Sciences.

Des Jarlais, D. C. (1996). Comments on Stimson's "Has the United Kingdom averted an epidemic of HIV-1 infection among drug injectors?" Addiction, 91, 1089-1089.

Dennis, M. L., Ingram, P. W., Burks, M. E., & Rachal, J. V. (1994). Effectiveness of streamlined admissions to methadone treatment: A simplified time-series analysis. Journal of Psychoactive Drugs, 26, 207-216.

Dole, V. P. (1994). Special communications: Implications of methadone maintenance for theories of narcotic addiction. In H. Joseph & J. S. Woods (Eds.), Methadone treatment works: A compendium for methadone maintenance treatment. New York: Chemical Dependency Research Working Group [Online: http://www.users.interport.net/~nama/mono2.htm].

Dole, V. P., & Nyswander, M. E. (1965). A medical treatment for diacetyl-morphine (heroin) addiction. Journal of the American Medical Association, 193, 646.

Drucker, E. (1995). Harm reduction: A public health strategy. Current Issues in Public Health, 1, 64-70.

Ebert, B., & Ganser, J. (1997). Anesthesia and analgesia in intravenous drug dependent patients with injection abscesses of the upper extremity. Case report. Handchirurgie, Mikrochirurgie, Plastische Chirurgie, 29, 38-41.

General Accounting Office. (1990). Methadone maintenance: Some treatment programs are not effective. Greater federal oversight needed. Washington, DC: Author.

General Accounting Office. (1996). Cocaine treatment: Early results from various approaches. Washington, DC: Author [Online: http://www.gao.gov/via keyword search].

Gerstley L., Alterman A.I., McLellan, A.T., & Woody G.E. (1990) Antisocial personality disorder in patients of substance abuse disorders: A problematic diagnosis? American Journal of Psychiatry, 147, 173-178.

Herman, M. (1994). Acupuncture and the treatment of cocaine/crack abuse in a methadone maintenance program. In H. Joseph & J. S. Woods (Eds.), Cocaine addiction: Trends, laboratory research, clinical issues and treatment. New York: Chemical Dependency Research Working Group [Online: http://www.users.interport.net/~nama/mono1.htm]

Hubbard, R. L., Collins, J. J., Rachal, J. V., & Cavanaugh, E. R. (1988). The criminal justice client in drug abuse treatment. In C. G. Leukefeld & F. M. Tims (Eds.), Compulsory treatment of drug abuse: Research and clinical practice (NIDA Research Monograph No. 86, pp. 57-80). Rockville, MD: National Institute on Drug Abuse.

Hubbard, R. L., Marsden, M. E., Rachal, J. V., Harwood, H. J., Cavanaugh, E. R., & Ginzburg, H. M. (1989). Clients in the major modalities. In R. L. Hubbard, M. E. Marsden, J. V. Rachal, H. J. Harwood, E. R. Cavanaugh, & H. M. Ginzburg (Eds.), Drug abuse treatment: National study of effectiveness (pp. 71-98). Chapel Hill: University of North Carolina Press.

Hubbard, R.L., Craddock, S.G., Flynn, P.M., Anderson, J. and Etheridge, R.M. (1997) Overview of 1-year follow-up outcomes in the Drug Abuse Treatment Outcome Study (DATOS). Psychology of Addictive Behaviors, 11, 261-278.

Joe, G. W., Simpson, D. D., & Sells, S. B. (1994). Treatment process and relapse to opioid use during methadone maintenance. American Journal of Drug and Alcohol Abuse, 20, 173-197.

Joseph, H. (1994a). Methadone maintenance treatment and clinical issues. In H. Joseph & J. S. Woods (Eds.), Methadone treatment works: A compendium for methadone maintenance treatment. New York: Chemical Dependency Research Working Group [Online: http://www.users.interport.net/~nama/mono2.htm].

Joseph, H. (1994b). Methadone, HIV infection and immune function (Education Series No. 4) [Online: http://www.methadone.org/es4.html].

Joseph, H., & Appel, P. (1993). Historical perspectives and public health issues. In M. W. Parrino (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 11-24). Rockville, MD: Center for Substance Abuse Treatment.

Joseph, H., & Woods, J. S. (1995). A point in time: The impact of expanded methadone maintenance treatment on citywide crime and public health in New York City, 1971-1973. Belgium Archives of Public Health, 53, 213-231.

Kaltenbach, K., Silverman, N., & Wapner, R. (1993). Methadone maintenance during pregnancy. In M. W. Parrino (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 85-93). Rockville, MD: Center for Substance Abuse Treatment.

Kaplan, H.I., Sadock, B.J. and Grebb, J.A. (1994) Synopsis of Psychiatry, Behavioral Sciences Clinical Psychiatry. Seventh Edition.Williams and Wilkens, Baltimore, MD.

Kennedy, J., & Crowley, T. (1988). Chronic pain and substance abuse: A pilot study of narcotic maintenance. In L. S. Harris (Ed.), Problems of drug dependence: Proceedings of the 50th annual scientific meeting, the Committee on Problems of Drug Dependence (NIDA Research Monograph No. 90, p. 377). Rockville, MD: National Institute on Drug Abuse.

Kreek, M. J. (1973). Plasma and urine levels of methadone. New York State Journal of Medicine, 73, 2,773-2,777.

Lowinson, J. H., Marion, I. D., Joseph, H., & Dole, V. P. (1992). Methadone maintenance. In J. H. Lowinson, P. Ruiz, R. B. Millman, & J. G. Landgrod (Eds.), Substance abuse: A comprehensive textbook (2nd ed., pp. 550-561). Baltimore, MD: Williams and Wilkins.

Lowinson, J. H., Payte, J. T., Salsitz, E., Joseph, H., Marion, I. J., & Dole, V. P. (1997). Methadone maintenance. In J. H. Lowinson, P. Ruiz, R. B. Millman, & J. G. Landgrod (Eds.), Substance abuse: A comprehensive textbook (3rd. ed., pp. 405-414). Baltimore, MD: Williams and Wilkins.

Magura, S., Rosenblum, A., & Joseph, H. (1992). Evaluation of in-jail methadone maintenance: Preliminary results. In C. G. Leukefeld & F. M. Tims (Eds.), Drug abuse treatment in prisons and jails (NIDA Research Monograph No. 118, pp. 192-210). Rockville, MD: National Institute on Drug Abuse.

Magura, S., Rosenblum, A. Lewis, C., & Joseph, H. (1993). The effectiveness of in-jail methadone maintenance. Journal of Drug Issues, 23(1), 75-99.

Magura, S., Foote, J., Rosenblum, A., Handlesman, L., & Lovejoy, M. (1994). Enhanced positive reinforcement in cognitive-behavioral treatment of cocaine dependent methadone patients. In H. Joseph & J. S. Woods (Eds.), Cocaine addiction: Trends, laboratory research, clinical issues and treatment. New York: Chemical Dependency Research Working Group [Online: http://www.users.interport.net/~nama/mono1.htm].

Magura, S., Kang, S., Rosenblum, A., Handelsman, L., and Foote, J. (1998a) Gender differences in psychiatric comorbidity among cocaine-using opiate addicts. Journal of Addictive Diseases, 17, 49-61.

Magura, S., Rosenblum, A., and Rodriguez, E.M. (1998b) Changes in HIV risk behaviors among cocaine-using methadone patients. Journal of Addictive Diseases, 17, 71-90.

McArthur, L. C. & Goldsberry, Y. (1994). History of federal and state involvement in narcotic treatment. In L. C. McArthur, & Y. Goldsberry (Eds.), Approval and monitoring of narcotic treatment programs (Technical Assistance Publication No. 12, pp. 3-10). Rockville, MD: Center for Substance Abuse Treatment.

McLellan, A. T., Arndt, I. O., Metzger, D. S., Woody, G. E., & O'Brien, G. P. (1993). The effects of psychosocial services in substance abuse treatment. Journal of the American Medical Association, 269, 1953-1959.

Methadone hydrochloride (1997). In Mosby's GenRx 1998: The complete reference for brand and generic drugs. [Online: http://www.rxlist.com/cgi/generic/methdone.htm].

Metzger, D. S., Navaline, H., & Woody, G. E. (1998). Drug abuse treatment as AIDS prevention. Public Health, 113 (Supp. 1), 97.

Metzger, D.S., Woody, G.E., McLellan, A.T., O'Brien, C.P. Druly, P., Navaline, H., DePhilippis, D., Stolley, P. and Abrutyn, E. (1993) Human immunodeficiency virus seroconversion among intravenous drug users in-and out-of-treatment: an 18 month prospective follow-up. *Journal of Acquired Immune Deficiency Syndromes, 6*, 1049-1056.

Milby, J.S., Sims, M.K., Khuder, S., Schumacher, J.E., Huggins, N., et al. (1996). Psychiatric comorbidity: Prevalence in methadone maintenance treatment. American Journal of Drug and Alcohol Abuse, 22(1), 95-107.

Nadelmann, E. A., & McNeely, J. (1996). Doing methadone right. Public Interest, 123, 83-93.

Neshin, S. F. (1993). HIV and other infectious diseases. In M. W. Parrino (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 95-118). Rockville, MD: Center for Substance Abuse Treatment.

Newman, R. G. (1991). What's so special about methadone maintenance? Drug and Alcohol Review, 10, 225-232.

Novick, D. M., Joseph, H., Croxson, T. S., Salsitz, E. A., Wang, G., Richman, B. L., Poretsky, L., Keefe, J. B., & Whimbey, E. (1990). Absence of antibody to human immunodeficiency virus in long-term, socially rehabilitated methadone maintenance patients. Archives of Internal Medicine, 150, 97-99.

Nurco, D.N. , Kinlock, T., Balter, M.B. (1993) The severity of preaddiction criminal behavior among urban male narcotic addicts and two nonaddicted control groups. Journal of Research in Crime and Delinquency, 30, 293-316.

Office of National Drug Control Policy. Policy Paper: Opioid Agonist Treatment. Washington, DC.

Parrino, M. W., ed. (1993). List of DEA regulations governing narcotic treatment programs. In M. W. Parrino (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 171-187). Rockville, MD: Center for Substance Abuse Treatment.

Payte, J. T., & Khuri, E. T. (1993). Principles of methadone dose determination. In M. W. Parrino (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 47-58). Rockville, MD: Center for Substance Abuse Treatment.

Rawson, R. A., Obert, J. L., McCann, M. J., & Ling, W. (1990). Neurobehavioral treatment for cocaine dependency. Journal of Psychoactive Drugs, 22, 159-171.

Saxon, A. J., Wells, E. A., Fleming, C., Jackson, T. R., & Calsyn, D. A. (1996). Pre-treatment characteristics, program philosophy, and level of ancillary services as predictors of methadone maintenance treatment outcome. Addiction, 91, 1,197-1,209.

Scro, A. (1995, Spring-Summer). Let's stop the insanity. The Ombudsman, (3-4), 1.

Simpson, D.D., Sells, S.B. (1990) Opioid Addiction and Treatment : A 12-year Follow-up. Malablar, FL: Kreiger.

Stimson, G. V. (1996). Has the United Kingdom averted an epidemic of HIV-1 infection among drug injectors? Addiction, 91, 1,085-1,088.

Substance Abuse and Mental Health Services Administration. (1993). National drug and alcoholism treatment unit survey (NDATUS): 1991 main findings report. Rockville, MD: Author.

Szasz, T. (1994). Ethics of addiction. In T. Szasz (Ed.), Drugs and drug use in society (pp. 373-382). Kent, United Kingdom: Greenwich University Press.

Tunis, S. L., Delucchi, K. L, Schwartz, K., Banys, P., & Sees, K. L. (1995). The relationship of counselor and peer alliance to drug use and HIV risk behaviors in a six-month methadone detoxification program. Addictive Behaviors, 20, 395-405.

Woody, G.E., McLellan, A.T., Luborsky, L. and O'Brien, C.P. (1985) Sociopathy and psychotherapy outcome. Archives of General Psychiatry, 42, 1081-1086.

Zweben, J. E. (1993). Review of clinical issues. In M. W. Parrino (Ed.), State methadone treatment guidelines (Treatment Improvement Protocol No. 1, pp. 25-32). Rockville, MD: Center for Substance Abuse Treatment.

II. METHADONE TREATMENT BIBLIOGRAPHIES

1. INTRODUCTORY READING

Ball, J. C., Ross, A., & Jaffe, J. H. (1990). Cocaine and heroin use by methadone maintenance patients. In L. S. Harris (Ed.), Problems of drug dependence, 1989 (NIDA Research Monograph No. 95, p. 328). Rockville, MD: National Institute on Drug Abuse.

Although methadone maintenance treatment is effective in stopping intravenous drug use by most addict patients, a minority continues to use cocaine and heroin while in treatment. Factors associated with this continued drug abuse are addressed. The percentage of long-term patients at six methadone maintenance programs who used cocaine or heroin during treatment is shown. Overall, 24.4 percent of the 386 male patients used heroin and 16.3 percent used cocaine in the past 30 days.

Cacciola, J. S., Alterman, A. I., Rutherford, M. J., McKay, J. R., & McLellan, A. T. (1998). The early course of change in methadone maintenance. Addiction, 93, 41-49.

This study examined the functional and substance use status of methadone maintenance (MM) patients at treatment entry and 2 and 7 months later. Two groups of subjects were identified for longitudinal follow-up: those in continuous MM treatment and those who left treatment. The study was conducted at the Philadelphia Veterans Affairs Medical Center MM Program. The subjects were 157 men admitted to treatment. Change was evaluated using the Addiction Severity Index and urinalysis results. Both groups of subjects reported significant reductions in drug use and increases in psychosocial functioning from admission to month 2, but demonstrated no significant changes from months 2 to 7. Subjects who left treatment, however, had more heroin use and criminal activity at all evaluation points than subjects who remained in treatment. Urinalysis data also suggested that subjects who left treatment were using drugs more frequently while in treatment than were those subjects who remained continuously enrolled in MM. Finally, subjects who left treatment spent more time in restricted environments (e.g., inpatient treatment, jail) at follow-up. Services may need to be enhanced to foster continuing progress in patients who remain in MM treatment and to retain those patients with more severe problems who leave treatment early.

Craddock, S. G., Rounds-Bryant, J. L., Flynn, P. M., & Hubbard, R. L. (1997). Characteristics and pretreatment behaviors of clients entering drug abuse treatment: 1969 to 1993. American Journal of Drug and Alcohol Abuse, 23(1), 43-59.

This study summarizes historical changes among clients entering drug treatment in their sociodemographic characteristics and important pretreatment behaviors, such as work activity, criminal behavior, drug use, prior drug treatment, and health insurance. Data are drawn from three major studies of drug abuse treatment clients: The Drug Abuse Reporting Program (DARP), 1969-1972; the Treatment Outcome Prospective Study (TOPS), 1979-1981; and the Drug Abuse Treatment Outcome Study (DATOS), 1991-1993. The mix of drug treatment clients and their interaction with the drug treatment system changed substantially over the past 3 decades. Multiple drug use declined since the late 1970s, while reports of cocaine use since TOPS more than doubled among clients in the long-term residential and outpatient treatment modalities, and increased 1½ times among methadone clients. Other differences in treatment populations include decreases in clients working full-time and in reports of suicidal ideation and attempts and predatory crime. Data from such studies as DARP, TOPS, and DATOS are valuable in historical, contextual, policy, and evaluative frameworks. The changing nature of the drug treatment client population—from sociodemographics to drug use and multiple treatment problem severities—highlights the complexity of issues and difficulties encountered by those attempting to treat clients or plan treatment strategies. (Author abstract)

D'Amanda, C. (1983). Program policies and procedures associated with treatment outcome. In J. R. Cooper, F. Altman, B. S. Brown, & D. Czechowicz (Eds.), Research on the treatment of narcotic addiction: State of the art (pp. 637-679). Washington, DC: Government Printing Office.

Discharge policies affect outcome so diversely as to make differential evaluation impossible. Detoxification should be defined either as a goal of treatment, a process within some broader treatment goals, or some combination of each. Urine testing policies clearly exist, but cannot be demonstrated to have an outcome effect on illicit drug use. Dosage levels for patients maintained on methadone have been vigorously debated along a full spectrum of perspectives from rhetorical to pharmacodynamic. Take-home medication apparently does not affect outcome in terms of treatment retention. Use of alcohol by clients in methadone treatment requires urgent and careful study. Alcohol is unique among chemical substances of abuse because it serves as both a substitute and a replacement to heroin. No formal policy statements deny women access to methadone treatment programs, except in some instances when they are pregnant.

Dole, V. P. (1988). Implications of methadone maintenance for theories of narcotic addiction. Journal of the American Medical Association, 260, 3,025-3,029.

Clinical success in rehabilitation of heroin addicts with maintenance treatment requires stability of the blood level in a pharmacologically effective range (optimally, 150 to 600 ng/mL)—a phenomenon that emphasizes the central importance of narcotic receptor occupation. It is postulated that the high rate of relapse of addicts after detoxification from heroin use is due to persistent derangement of the endogenous ligand-narcotic receptor system and that methadone in an adequate daily dose compensates for this defect. Some patients with long histories of heroin use and subsequent rehabilitation on a maintenance program do well when the treatment is terminated. The majority experiences a return of symptoms after maintenance is stopped. The treatment, therefore, is corrective but not curative for severely addicted persons. A major challenge for future research is to identify the specific defect in receptor function and to repair it. Meanwhile, methadone maintenance provides a safe and effective way to normalize the function of otherwise intractable narcotic addicts.

Dole, V. P., & Joseph, H. (1978). Long-term outcome of patients treated with methadone maintenance. Annals of the New York Academy of Sciences, 311, 181-189.

The authors describe contributory factors to narcotic addiction and focus on addicts admitted to methadone maintenance in New York since 1965. A follow-up study was conducted of patients who were admitted at two different time points. The effectiveness of maintenance treatment in controlling the use of illicit opiates is discussed. The authors describe their search for predictive factors, such as behavior in treatment and category of discharge and post-treatment outcome. The article also discusses non-opiate problems after detoxification, such as psychopathology and alcohol use. Finally, the authors look at re-admission of these clients into treatment.

Franklin, J. E. (1993). Addiction medicine. Journal of the American Medical Association, 270, 184-185.

Addiction medicine is discussed. Topics addressed in this review of literature include: treatment methods for special populations; alcoholism; buprenorphine hydrochloride; methadone; opioid receptors; tuberculosis; human immunodeficiency virus; gender differences; and nicotine addiction. It is concluded that there will be a need in coming years to improve treatment effectiveness and cost-effectiveness.

Kauffman, J. F., & Woody, G. E. (Eds.). (1995). Matching treatment to patient needs in opioid substitution therapy (Treatment Improvement Protocol No. 20). Rockville, MD: Center for Substance Abuse Treatment.

Patient-treatment matching is an effective method for getting individuals into treatment. It is especially effective for those with opioid problems. Treating patients in methadone maintenance or other therapy can help patients begin to return to a less drug-centered life. Patient-treatment matching to methadone maintenance has been shown to be highly effective as well as cost-effective.

Kleber, H. D. (Ed.). (1994). Assessment and treatment of cocaine-abusing methadone maintained patients (Treatment Improvement Protocol No. 10). Rockville, MD: Center for Substance Abuse Treatment.

It is not unusual for methadone-maintained individuals to use cocaine. This makes treatment even more difficult. Treatment providers need to deal with the numerous issues surrounding this client group. The treatment programs should have the ability to handle those that abuse multiple substances and have a physician to take care of the medical needs of these clients. They also need to have connections to other programs to help provide all of the services their clients need. The cultural appropriateness of treatment should be considered as well. A treatment program that is comprehensive, treating all addictions, medical, psychiatric, and social needs, is much more likely to retain clients and help them recover.

Kreek, M. J. (1990). Drug interactions with methadone in humans related to drug abuse and its treatment. In M. W. Adler & A. Cowan (Eds.), Testing and evaluation of drugs of abuse (pp. 265-282). New York: Wiley-Liss.

One of the most common drug-related problem necessitating medical emergency room visits and causing drug-related deaths has been "alcohol-in-combination" with other drugs, according to the DAWN surveys performed under the auspices of NIDA. Cocaine abuse is not the leading cause of emergency room visits for drug-related reasons. The second and third drugs most commonly involved in drug-related deaths are heroin and cocaine, respectively. The use of these two drugs is frequently accompanied by polydrug abuse. Studies of both pharmacokinetic and pharmacodynamic interactions between such drugs of abuse and the resulting physiological and pathological effects of combined use in humans have been investigated only to a limited extent. Results of these studies as well as a few potentially important anecdotal clinical reports and a few relevant animal studies are summarized.

Levin, F. R., Foltin, R. W., & Fischman, M. W. (1996). Pattern of cocaine use in methadone maintained individuals applying for research studies. Journal of Addictive Diseases, 15(4), 97-106.

Methadone maintained individuals seeking admission into an intravenous cocaine study were interviewed using an assessment of drug use patterns. Although the number of cocaine injections ranged from two to twenty each day, seven of eleven subjects injected at least five times per day. Possible explanations for the consistent, combined cocaine and methadone use include an intensified subjective response to methadone and/or cocaine; a novel subjective response to methadone and/or cocaine; and a modulation of drug-induced effects. Binge cocaine use does not appear to be a typical pattern of use among methadone patients; however, during daily periods of cocaine use, multiple repeated injections of large amounts of cocaine are taken and these might place patients at substantial risk for medical complications.

Magura, S., & Rosenblum, A. (Eds.). (1994). Experimental therapeutics in addiction medicine. New York, NY: Haworth Press.

This volume contains experimental research on drug abuse treatments, including medications and behavioral therapies for heroin and cocaine addictions. It presents original experimental research on the effectiveness of treatments for heroin/opiate, cocaine, and methamphetamine addiction. Unlike much previous drug treatment research, the studies use biological indicators of drug use rather than just self-report measures. Drug toxicologies to measure outcomes are included. The 15 studies are a result of a nationwide treatment research initiative sponsored by the National

Institute on Drug Abuse (NIDA) and come from 11 States. The evaluations, most using experimental designs with random assignment, include investigations of pharmacological, psychosocial, and behavioral therapies. The psychosocial and behavioral therapies include theory-based intensive outpatient programs for cocaine and methamphetamine abusers; medical maintenance for stabilized methadone patients; acupuncture treatment for cocaine and crack abusers; and intensive counseling combined with contingency management for methadone patients.

Margolin, A., Avants, S. K., Rounsaville, B., Kosten, T. R., & Schottenfeld R. S. (1997). Motivational factors in cocaine pharmacotherapy trials with methadone maintained patients: Problems and paradoxes. Journal of Psychoactive Drugs, 29, 205-212.

Pharmacotherapy trials for cocaine abuse among methadone-maintained patients have typically reported negative findings as well as high rates of cocaine use during the trial. The contribution of motivational factors to these results is a potentially important, under-investigated area. This article points out that some methadone-maintained patients may enter a trial for cocaine abuse with little desire for treatment, motivated primarily to continue receiving methadone or to avoid program sanctions for continued cocaine use. Participants in clinical trials may constitute a phase-delaying discharge in a cyclic pattern of multiple treatment episodes. Testing a pharmacologic agent in a motivationally inappropriate sample may not provide a good estimate of the agent's effectiveness. In view of the important public health role that methadone maintenance programs play in preventing HIV transmission, and the subversion of this role by intravenous cocaine use, solutions to these problems are urgently needed. The authors suggest several possible approaches, including pre- and post-treatment motivation assessment, as well as the inclusion of psychosocial interventions that provide the context for the emergence of potential medication effects.

Marion, I. J. (1995). LAAM in the treatment of opiate addiction (Technical Assistance Publication No. 22). Rockville, MD: Center for Substance Abuse Treatment.

Levo-alpha-acetyl-methadol (LAAM) was first developed in 1948 as an analgesic. In 1993, it was approved by the FDA as a treatment for opioid addiction. It works similarly to methadone, in that it blocks the opiate receptors in cells. It is also longer lasting than methadone, thus eliminating daily trips to the methadone clinic. Women who use LAAM need to be tested monthly for pregnancy, as its effect on the unborn are unknown.

McArthur, L. C., & Goldsberry, Y. (1994). Approval and monitoring of narcotic treatment programs: A guide on the roles of federal and state agencies. Rockville, MD: Center for Substance Abuse Treatment.

This guide provides a step-by-step overview of Federal and State agencies during the process of program approval and monitoring. It reviews the approval and monitoring procedures applicable to methadone treatment. The manual also suggests that the same procedures are expected to be used in other opioid medication therapies approved by Federal and State regulatory agencies. State and Federal agencies share responsibilities for approving and disapproving, monitoring, and setting guidelines for narcotic treatment programs. The guide further explains the roles of the Food and Drug Administration, Drug Enforcement Administration, National Institute on Drug Abuse, Center for Substance Abuse Treatment, and the Substance Abuse and Mental Health Services Administration. Appendices provide pertinent regulations and sample forms.

Novick, D. M., & Joseph, H. (1991). Medical maintenance: The treatment of chronic opiate dependence in general medical practice. Journal of Substance Abuse Treatment, 8, 233-239.

Medical maintenance was created to treat rehabilitated methadone maintenance patients within the context of general medical practice. One hundred methadone patients who met screening criteria were transferred for continuing care from traditional methadone clinics either to the practices of hospital-based physicians or to a health maintenance organization. Patients see their physicians about once per month, submit urine samples at the time of the office visits, drink a dose of methadone in the presence of their doctor or nurse, and receive a 28-day supply of methadone in pill or tablet form. The methadone prescriptions are filled by the hospital pharmacies. Physicians are responsible for the patients' annual physicals and can treat patients for other conditions. In our initial analysis of medical maintenance, 82.5 percent of the patients remained in good standing and 5 percent left the program voluntarily in good standing; the remaining 12.5 percent who were unable to respond favorably were returned to clinic programs. For rehabilitated patients requiring long-term or life-long care, medical maintenance is a viable alternative to traditional clinic programs. With proper policies and procedures, medical maintenance can be implemented in many hospitals. (Author abstract)

Novick, D. M., Joseph, H., Salsitz, E. A., Kalin, M. F., Keefe, J. B. (1994). Outcomes of treatment of socially rehabilitated methadone maintenance patients in physicians' offices (methadone maintenance): Follow-up at 3 ½ to 9 ¼ years. Journal of General Internal Medicine, 9, 127-130.

This study examines whether selected socially rehabilitated former heroin addicts maintained on methadone can continue successful rehabilitation while maintained on methadone by primary care physicians rather than licensed clinics. This procedure has been termed "medical maintenance." A cohort study with 42-111 months of follow-up took place in the offices of hospital staff physicians. The 100 patients had to meet extensive entry criteria, including 5 or more years in conventional methadone maintenance treatment; stable employment or other productive activity; verifiable financial support; and no criminal involvement, use of illegal drugs, or excessive alcohol use within 3 or more years. Outcome measures used were retention in treatment, discharge for one of several reasons, lost medication incidents, and substance abuse. At 1, 2, and 3 years of treatment, 98, 95, and 85 patients, respectively, remained in medical maintenance. Cumulative proportional survival in treatment was 0.735 ± 0.048 at 5 years and 0.562 ± 0.084 at 9 years. After 42-111 months, 2 patients remained in good standing; 15 patients had unfavorable discharges; seven voluntarily withdrew from methadone in good standing; four died; one transferred to a chronic care facility; and one voluntarily left the program. Carefully selected methadone maintenance patients have a high retention rate and a low incidence of substance abuse and lost medication. Voluntary withdrawal from methadone maintenance after 1 or 2 decades is possible. The authors believe that medical maintenance should be made available to appropriate patients in other localities. (Author abstract modified)

Novick, D. M., Pascarelli, E. F., Joseph, H., Salsitz, E. A., Richman, B. L., Des Jarlais, D. C., Anderson, M., Dole, V. P., & Nyswander, M. E. (1988). Methadone maintenance patients in general medical practice. Journal of the American Medical Association, 259, 3,299-3,302.

Medical maintenance is the treatment by primary care physicians of rehabilitated methadone maintenance patients who are stable, employed, not abusing drugs, and not in need of supportive services. In this research project, physicians with experience in drug abuse treatment provided both the pharmacological treatment of addiction as well as therapy for other medical problems as needed. Decisions regarding treatment were based on the individual needs of the patient and on currently accepted medical practice rather than on explicit regulations. The first 40 former heroin addicts who were transferred to this program from more conventional methadone clinics were studied. At a follow-up visit at 12 to 55 months, 33 (82.5%) of 40 patients had remained in treatment; five (12.5%) had been discharged because of cocaine abuse and two (5%) had been voluntarily discharged. Personal benefits of medical maintenance include the dignity of a standard professional atmosphere and a more flexible reporting schedule. This program has the potential for improving treatment of selected methadone maintenance patients. (Author abstract)

Onken, L. S., Blaine, J. D., & Boren, J. J. (Eds.). (1993). Behavioral treatments for drug abuse and dependence (NIDA Research Monograph No. 137). Rockville, MD: National Institute on Drug Abuse.

Behavioral treatments for drug abuse and dependence are presented and discussed. Some of these treatments include the use of positive incentives as a method of contingency management in methadone treatment; behavioral interventions; cue reactivity interventions; treating cocaine through behavior analysis and behavioral pharmacology; cognitive therapy; harm reduction; multi-systemic treatment of serious juvenile offenders; dialectical behavior therapy for the treatment of borderline personality disorder; the use of treatment outcome measurement in research; between group therapy outcome research design and methodology; and the use of alcohol treatment outcome in developing behavioral treatments.

Polinsky, M. L., Hser, Y. I., & Grella, C. E. (1998). Consideration of special populations in the drug treatment system of a large metropolitan area. Journal of Behavioral Health Services and Research, 25, 7-21.

This study provides an overview of the characteristics of clients in the Los Angeles County drug treatment system with special attention to substance abusers enrolled and the services provided. A self-reported mail survey was conducted of 294 treatment programs in the county. Special population clients were assigned to non-mutually exclusive groups based on gender-related needs, language needs, ethnic background and health status. Of the 294 programs, 9 percent were hospital inpatient, 19 percent residential, 32 percent outpatient drug-free, 13 percent outpatient methadone maintenance, 16 percent outpatient detoxification with medication (including methadone), and 12 percent day treatment. Survey results indicated that a high proportion of programs reported having the capability to meet the unique needs of a variety of special population clients. However, this capability differed significantly across modalities in terms of serving the special needs of those with physical and mental impairments, primarily Spanish speakers, and females. In general, fewer residential programs reported the capability of serving these special populations, indicating the specific nature of the long-term, line-in residential program treatment approach. Differences across modality were not significant with regard to client ethnic background. Although many programs reported having some mix of special population in their current caseload, many reported that they did not have clients of that special population type on the day the survey was conducted. The survey results suggest considering an offer of specialized programs.

Rosenblum, A., Magura, S., & Joseph H. (1991). Ambivalence toward methadone treatment among intravenous drug users. Journal of Psychoactive Drugs, 23(1), 21-27.

Interviews were conducted with a sample of jailed intravenous opioid users who were not in treatment at the time of their arrest and who were admitted to an in-jail methadone maintenance program. At release, subjects were to be referred to dedicated slots in participating community methadone programs. Virtually all subjects were daily injectors of heroin and cocaine. Although the majority of subjects had previous episodes of methadone maintenance, most reported anxieties about methadone, such as bone decalcification and possible overdosing. Women and those subjects who shared needles were more likely to report fears about methadone. Only 52 percent of the subjects stated that they intended to report to a methadone program after their release, and 45 percent did not expect to remain in treatment for more than 1 year. Subjects who stated that they were not afraid of methadone, frequently injected drugs, and rarely used crack, were more likely to express intentions to enroll and remain in community methadone treatment. Ambivalence toward methadone treatment may be a result of unrealistic concerns about the side effects of methadone and personal heuristics regarding the nature of addiction and the efficacy of treatment.

Woods, J. S. (1997). Advocacy: The voice of the consumer. In J. H. Lowinson, P. Ruiz, R. B. Millman, & J. G. Langrod (Eds.), Substance abuse: A comprehensive textbook (3rd ed., pp. 865-873). Baltimore, MD: Williams and Wilkins.

This chapter describes the methadone advocacy movement. Sections of the chapter cover alcohol advocacy; therapeutic communities; the rise of advocacy for methadone patients; the first methadone advocacy group (Committee of Concerned Methadone Patients and Friends, Inc.); the problem of stigmatization of heroin addicts for being in methadone treatment; sensationalistic anti-methadone propaganda in the media; civil actions against discrimination toward methadone patients; organization of the Association of Former Drug Abusers for Prevention and Treatment (ADAPT); the Rikers Island food strike; ADAPT's contribution; stigma as the greatest barrier to recovery for methadone patients; methaphobia and the medical profession; demanding quality methadone treatment; creating a positive image for patients taking methadone; and working for change through education and advocacy.

2. TREATMENT

2.1 Counseling

Alterman, A. I., Rutherford, M. J., Cacciola, J. S., McKay, J. R., & Woody, G. E. (1996). Response to methadone maintenance and counseling in antisocial patients with and without major depression. Journal of Nervous and Mental Disease, 184, 695-702.

This study compared the treatment response of opiate-dependent, methadone maintained patients receiving drug counseling. Patients were grouped as opiate-dependent only; opiate-dependent with a lifetime diagnosis of depression; opiate-dependent with concurrent antisocial personality and lifetime major depression; and opiate-dependent with comorbid antisocial personality. All groups evidence concurrent use of alcohol and other drugs. Patients were assessed at intake, during treatment, and 7 months after treatment admission on treatment compliance, urine toxicology results, and Addiction Severity Index status. During treatment, results show positive urine toxicology for all groups for benzodiazepines, cocaine, opiate, or amphetamines. Urine toxicology at 7-month follow-up showed significant differences in drug and alcohol use between the antisocial personality disorder only group and the other three opiate-dependent groups. Data show considerable improvement for all groups in the drug area and varying degrees of improvement in the legal, psychiatric, employment, family/social, and alcohol areas. The antisocial personality subjects reported more improvement than the other opiate-dependent groups. Results show considerable evidence that both groups of antisocial personality subjects showed significant gains associated with methadone maintenance and drug counseling.

Brewer, C. (1996). On the specific effectiveness, and under-valuing, of pharmacological treatments for addiction: A comparison of methadone, naltrexone and disulfiram with psychosocial interventions. Addiction Research, 3, 297-313.

This paper argues for the effectiveness of pharmacological intervention with naltrexone, disulfiram, and methadone maintenance as one aspect of treating opiate, alcohol, or heroin addiction. For each drug, research is cited supporting its effectiveness in many stages of addiction treatment, such as detoxification, outpatient care, and relapse prevention. Reasons are listed for the underuse of these treatments, including the attitudes of 12-step programs toward what they see as substitute drugs, psychoanalytic traditions, misconceptions about the medical model, professional rivalries, exaggerated fears of side effects, and ignorance of the research literature. It is concluded that these pharmacological approaches need to be offered as choices, along with psychosocial interventions, to alcohol abusing or heroin-addicted patients so they have input into the appropriateness of their treatment.

Calsyn, D. A., Wells, E. A., Saxon, A. J., Wrede, A. F., Stanton, V. et al. (1994). Contingency management of urinalysis results and intensity of counseling services have an interactive impact on methadone maintenance treatment outcome. Journal of Addictive Diseases, 13(3), 47-63.

In a 3 x 2 factorial design, 360 new admissions to methadone maintenance were randomly assigned to one of three levels of counseling: medication only, standard counseling, and enhanced services; and one of two contingency contracting conditions: no contingencies (NC), and contingency contracting (CC). Contingency contracting included discharge for continuous positive urine samples; subsequently CC subjects were discharged at a greater rate than the NC group. However, CC subjects were more likely to be readmitted. NC subjects provided more urine samples positive for any illicit drug use than did CC subjects. For opiate-positive subjects, a significant level of counseling by contingency contracting interaction was found with medication only/CC subjects obtaining fewer opiate-positive results than medication only/NC subjects. The impact of reduced or enhanced services and of contingency contracting will not be fully understood until the longer term follow-up (18 and 24 months) is completed. Results suggest that contingency management procedures could be utilized in settings offering minimum services (e.g., "interim methadone") to achieve treatment outcomes similar to programs offering standard counseling services.

Glass, R. M. (1993). Methadone maintenance: New research on a controversial treatment. Journal of the American Medical Association, 269, 1995-1996.

Methadone maintenance, often criticized as an appropriate treatment for opiate addicts because it substitutes another drug for the addicting drug, relieves craving for heroin and blocks its euphoric effects while creating a condition of pharmacologic stability that permits psychosocial treatment and rehabilitation of patients whose lives previously were dominated by their addiction. Opponents ignore the essential issue of patient outcomes. As with any intervention, the important issues pertaining to methadone treatment are its safety, efficacy, and cost-effectiveness compared with alternative treatments or no treatment. Both the medication and the supporting program are essential. Psychosocial services aid substantially in achieving good outcomes in methadone maintenance treatment. Studies have shown that temporary treatment with methadone and minimal counseling can reduce heroin use and increase the proportion of addicts entering treatment, but that additional psychosocial services are necessary for better patient outcomes.

Goehl, L., Nunes, E., Quitkin, F., & Hilton, I. (1993). Social networks and methadone treatment outcome: The costs and benefits of social ties. American Journal of Drug and Alcohol Abuse, 19, 251-262.

This study assessed the impact of social ties on substance abuse treatment outcome. Two models that predict alternative hypotheses were evaluated. Based on the self-medication model, it was hypothesized that social support would aid in coping with painful affect and decrease the need for drugs. Based on a social learning model, it was hypothesized that drug use in the social network would threaten abstinence due to modeling and conditioning effects. Seventy methadone maintenance patients were given baseline measures of mood, stress, social support, and drug use in the network and followed prospectively for 3 months with weekly urine drug screens. Social support was correlated with positive affect (r=.59, p<.001), and stress with negative affect (r=.46, p<.001), but no measures of social support, affect, or stress correlated with the proportion of drug positive urine samples. However, patients with at least one drug user among the closest significant others had 63 ± 38 percent positive urines versus 35 ± 36 percent positive among those without a drug-using significant other (-3.2, p<.002). Substance use in the social network had a substantial negative impact on treatment outcome. Consistent with the social learning model and the traditional "persons, places, and things," this suggests that interventions should get drug-using significant others into treatment and teach patients coping skills to reduce their significant others negative influence. (Author abstract modified)

Maddux, J. F., Ingram, J. M., & Desmond, D. P. (1995). Reliability of two brief questionnaires for drug abuse treatment evaluation. American Journal of Drug and Alcohol Abuse, 21, 209-221.

The authors report the inter-interviewer reliability of two brief questionnaires developed to measure the effects of innovations in methadone maintenance. The instruments were designed to answer the research questions, but to intrude only minimally into the clinical assessment and treatment processes. The Initial Interview, completed at the time of admission, yielded information on 23 variables, and the Follow-up Interview, completed as soon as possible after the first anniversary of admission, yielded information on 20 variables. To assess reliability, a repeat interview was conducted by a different interviewer immediately after the first interview was completed. Repeat interviews were conducted with 19 subjects who completed the Initial Interview and 30 who completed the Follow-up Interview. Exact agreement was found in all the pairs of responses from the Initial Interview for 5 of the 6 categorical variables and 6 of the 17 quantitative variables. For the remaining 11 quantitative variables, the intraclass correlation coefficients ranged from .700 to .999. Exact agreement was found in all pairs of responses from the Follow-up Interview for 2 of the 4 categorical variables and 8 of the 16 quantitative variables. For each of the remaining categorical variables, the kappa statistic was significant (.73 and .49). For the remaining eight quantitative variables, the intraclass correlation coefficients ranged from .750 to .999. The findings signify satisfactory inter-interviewer reliability of the instruments. These brief instruments could easily be adapted for use in other treatment evaluation studies where brevity in data collection is considered desirable. (Author abstract)

McCann, M. J., Rawson, R. A., Obert, R. L., & Hasson, A. J. (1994). Treatment of opiate addiction with methadone: A counselor manual (Technical Assistance Publication No. 7). Rockville, MD: Center for Substance Abuse Treatment.

This manual is intended to facilitate training of new counselors and to improve the quality of counseling component in methadone treatment for opiate addicts. Chapter 1 provides an overview of methadone treatment; chapter 2 discusses the role of counseling in methadone treatment; chapter 3 describes the treatment method and clinical issues dealing with alcohol and drug abuse; chapter 4 focuses short-term detoxification using methadone; chapter 5 addresses methadone treatment for special populations; and chapter 6 highlights the administrative aspects. A number of forms and materials are provided that may be useful both in implementing some of the Federal requirements and regulations and counseling activities.

O'Brien, C. P., Woody, G. E., & McLellan, A. T. (1995). Enhancing the effectiveness of methadone using psychotherapeutic interventions. In L. S. Onken, J. D. Blaine, & J. J. Boren (Eds.), Integrating behavioral therapies with medications in the treatment of drug dependence (NIDA Research Monograph No. 150, pp. 5-18). Rockville, MD: National Institute on Drug Abuse.

There is consistent evidence that the efficacy of methadone can be enhanced by psychotherapeutic interventions. For individual psychotherapy, the increased efficacy is most demonstrable among methadone patients also suffering from psychiatric disorders. Patients with severe psychiatric problems generally show little response to drug counseling alone. There is no evidence of a consistent advantage of one type of psychotherapy over another. Contingency contracting using take-home doses of methadone to reinforce drug-free urine samples has been shown to be effective, at least over the short term. Rewarding clean urine samples by vouchers exchangeable for retail items is supported by a growing experimental database, although practical issues remain for publicly funded methadone programs. The use of methadone dose as a reinforcer has shown some efficacy, but there are both ethical and conceptual problems. Finally, while there are likely to be some benefits from simply administering methadone alone in the most economical way, the available evidence clearly shows that a relatively minor investment in counseling, individual psychotherapy, or contingency contracting can result in major improvements in the results of this medication.

O'Malley, S. (1995). Psychosocial treatments for drug abuse. In C. Stefanis, H. Hippius, & D. Naber (Eds.), Research in addiction: An update (Psychiatry in Progress Vol. 2, pp. 129-138). Seattle, WA: Hogrefe and Huber Publishers.

Literature is reviewed on the important role of psychosocial interventions in the treatment of drug abuse. The benefits of such interventions go beyond reducing drug use to improving emotional, vocational, and family functioning and maintaining change. The needs of patients vary greatly. For some, a single advice session from a general practitioner can be very effective, while others need a comprehensive drug rehabilitation program. Major chapter topics include methadone maintenance therapy, psychosocial treatments for cocaine abuse, and psychosocial treatments in alcohol abuse.

Reilly, P. M., Banys, P., Tusel, D. J., & Sees, K. L. (1995). Methadone transition treatment: A treatment model for 180-day methadone detoxification. International Journal of the Addictions, 30, 387-402.

For those drug addicts who do not meet the United States Federal government regulations for methadone maintenance, methadone detoxification remains the primary option for treatment. Studies on the effectiveness of 21-day methadone detoxification, however, report low completion rates and high relapse. Revisions to the standard 21-day detoxification are needed. The research literature suggests that offering psychosocial services within an extended 180-day protocol may be an effective mode of treatment for those addicts who do not meet the requirements for entering methadone maintenance, or do not desire maintenance. Methadone Transition Treatment (MTT) is an innovative treatment organized around this strategy. MTT is transitional in that emphasis is placed on working with patients to enter longer-term treatment. To aid the development of similar programs at other institutions, the authors describe specific procedures of the MTT model and provide an evaluation of the model based on findings from an initial pilot study.

Reilly, P. M., Sees, K. L., Hall, S. M., Shopshire, M. S., Delucchi, K. L., Tusel, D. J., Banys, P., Clark, H. W., & Piotnowski, N. A. (1995). Self-efficacy and illicit opioid use in a 180-day methadone detoxification treatment. Journal of Consulting and Clinical Psychology, 23, 158-162.

Self-efficacy ratings coincided with illicit opioid use across the 3 phases of a 180-day methadone detoxification treatment. Efficacy ratings increased after patients received their first dose of methadone, did not change while they were maintained on a stable dose of methadone, and declined during the taper as they attempted to face high-risk situations without the full benefit of methadone. Efficacy ratings measured at a point before a phase of treatment predicted illicit opioid use across that phase. For clarification of the relation between self-efficacy and illicit opioid use, 3 conceptual models proposed by J. S. Baer, C. S. Holt, and E. Lichtenstein (1986) were tested. Self-efficacy influenced subsequent drug use in parallel with previous behavior, but this influence was found only at the start of the stabilization phase and immediately before the start of the taper phase. These findings highlight the usefulness of the self-efficacy concept for the treatment of opioid addiction.

Rosenblum, A., Magura, S., & Joseph H. (1991). Ambivalence toward methadone treatment among intravenous drug users. Journal of Psychoactive Drugs, 23(1), 21-27.

Interviews were conducted with a sample of jailed intravenous opioid users who were not in treatment at the time of their arrest and who were admitted to an in-jail methadone maintenance program. At release, subjects were to be referred to dedicated slots in participating community methadone programs. Virtually all subjects were daily injectors of heroin and cocaine. Although the majority of subjects had previous episodes of methadone maintenance, most reported anxieties about methadone, such as bone decalcification and possible overdosing. Women and subjects who shared needles were more likely to report fears about methadone. Only 52 percent of the subjects stated that they intended to report to a methadone program after their release and 45 percent did not expect to remain in treatment for more than 1 year. Subjects who stated that they were not afraid of methadone, frequently injected drugs, and rarely used crack were more likely to express intentions to enroll and remain in community methadone treatment. Ambivalence toward methadone treatment may be a result of unrealistic concerns about the side effects of methadone and personal heuristics regarding the nature of addiction and the efficacy of treatment.

Simpson, D. D. & Joe, G. W. (1993). Motivation as a predictor of early dropout from drug abuse treatment. Psychotherapy, 30, 357-368.

This study examined the psychometric and concurrent validity data for three treatment motivation scales: Drug Use Problems, Desire for Help, and Treatment Readiness; and analyzed their predictive validity with respect to early treatment dropouts from methadone maintenance (MM). Each scale was composed of 7 to 9 items. Analysis of data collected from 311 opioid addicts admitted to three methadone maintenance clinics indicated that 24 percent dropped out within 60 days of admission. The scales were found to be reliable, and evidence of validity was based on comparisons with other background and pretreatment functioning measures. Predictors of treatment retention beyond 60 days were social stability, previous treatment experience, expectations for reducing future drug use, higher methadone dose level, and higher motivation.

2.2 Dosage

Bell, J., Chan, J., & Kuk, A. (1995). Investigating the influence of treatment philosophy on outcome of methadone maintenance. Addiction, 90, 823-830.

This study is based on a 'natural experiment' in which a cohort of heroin users was assessed at one unit, then referred on geographic grounds for treatment to one of two clinics—one orientated to long-term maintenance (Clinic 2, with 61 subjects), the other to time-limited treatment aimed at achieving abstinence from all drugs including methadone (Clinic 1, 141 subjects). The outcome measure was heroin use as measured by urine testing performed regularly at both clinics. Overall, 25 percent of urine tests from Clinic 1 were positive for heroin compared to 18 percent in Clinic 2. This difference reflected in part a high rate of heroin use during the period of mandatory withdrawal from treatment in Clinic 1. Statistical models were developed to identify factors associated with heroin use. There was a strong association between methadone dose and heroin use; relative to a daily dose of 40 mg, a dose of 80 mg/day of methadone was less likely to be associated with a heroin-positive urine (OR 0.55, 95% CI [0.45, 0.68]). Average doses prescribed in Clinic 1 were lower, reflecting the clinic's orientation to abstinence. Adjusting for dose, and for the fact that certain individuals tend to use heroin heavily while others do not, there was no difference between the clinics in risk of heroin use during maintenance treatment. The higher rates of heroin use in the abstinence-orientated clinic were attributable to time-limited treatment and the use of lower doses of methadone. This finding confirms that in investigating the effects of treatment factors, the powerful influence of methadone dose needs to be taken into account.

Borg, L., Ho, A., Peters, J. E., & Kreek, M. J. (1995). Availability of reliable serum methadone determination for management of symptomatic patients. Journal of the Addictive Diseases, 14, 83-96.

Methadone, when used in the appropriate dose, prevents opioid withdrawal during the 24-hour period following medication. However, the appropriate dose for a given patient may be difficult to determine due to variations in methadone metabolism, which is affected by many factors. Early opioid withdrawal, requiring a higher dose of methadone, is often difficult to diagnose because many of the symptoms are also symptoms of other syndromes common in the methadone maintenance population. In this study, ten patients in stable methadone maintenance treatment reporting > or = 4 Himmelsbach signs of abstinence were compared with ten patients reporting fewer symptoms. Until recently, accurate, precise, and affordable determination of serum methadone level has not been readily available from commercial laboratories. This study has found that such measures are now available. Serum specimens from each subject were sent to three commercial laboratories for determination of serum methadone level. Results from the three laboratories were highly correlated. No statistical correlation was found between serum methadone level and number of Himmelsbach signs. Of the subjects reporting four or more symptoms, 40 percent had low serum methadone levels (< 150 ng/ml); 60 percent did not. Of the subjects reporting fewer than four symptoms, 90 percent had serum methadone levels > or = 150 ng/ml. Subjects with > or = 4 Himmelsbach signs had lower dose-adjusted serum methadone levels, the amount of methadone circulating per mg dose, ($t = 1.54$, $p < .0702$). Thus, for patients who report symptoms that could be attributable to opioid withdrawal, measurement of serum methadone level may help to differentiate complaints due to early abstinence from those due to other medical conditions.

Hartel, D. M., Schoenbaum, E. E., Selwyn, P. A., Kline, J., Davenny, K. et al. (1995). Heroin use during methadone maintenance treatment: The importance of methadone dose and cocaine use. American Journal of Public Health, 85, 83-88.

The purpose of this study was to examine factors associated with heroin use during methadone maintenance treatment. Logistic regression statistical models were used to examine data obtained in a cross-sectional sample of 652 methadone patients. Heroin use during the 3 months prior to interview was shown to be greatest among patients maintained on methadone dosages of less than 70 mg/day (adjusted odds ratio [OR] = 2.1, 95% confidence interval [CI] = 1.3, 3.4) and patients who used cocaine during treatment (adjusted OR = 5.9, 95% CI = 3.8, 9.1). These results were independent of treatment duration, treatment compliance, alcohol use, and socioeconomic factors. Cocaine users were more likely than nonusers of cocaine to use heroin at all methadone dosage levels. This study confirms and extends past research showing high-dose methadone maintenance to be important to heroin abstinence. Further investigation of the independent association between heroin use and cocaine use is needed. (Author abstract modified)

Havassy, B.E. and Tschann, J.M. (1984) Chronic heroin use during methadone maintenance: a test of the efficacy of high methadone doses, Addictive Behaviors, 9, 57-65.

N=29 methadone treated clients were randomly assigned to a program which administered an increasing methadone dose and N=25 were randomly assigned to a programs which administered a stable methadone dose. The purpose of the study was to assess whether or not an increasing dose of methadone reduce opiate use in comparison to a stable methadone dose? Clients receiving a dose increment did not reduce their illicit use of opiates. Clients receiving a stable dose, decreased their rate of opiate abuse. The evidence pointed to the importance of the ways in which the two programs responded to violations in program rules. In addition to substantial increases in dose, it was concluded that the consequences of violating program rules need to be made clear and be consistently enforced. This principle was adhered to more closely in the stable dose program, where clients were administratively detoxified for repeated rule violations.

Kell, M. J. (1995). Utilization of plasma and urine methadone concentration measurements to limit narcotics use in methadone maintenance patients: II. Generation of plasma concentration response curves. Journal of the Addictive Diseases, 14, 85-108.

Controversy still exists concerning the proper daily dose of methadone required to eliminate illicit narcotics use. To address this, urine methadone and opioid concentrations were measured prospectively (150 maintenance patients, 18-month period, 9,250 urine samples) using fluorescence polarization immunoassay. Results demonstrate that current thresholds (EMIT uses 300 micrograms/L) defining opiate-positive urine samples are overly high (FPIA can go as low as 25 micrograms/L), causing severe underestimation of opioid use in the typical clinic. Using this data, plasma methadone concentration and dose response probability curves were generated for illicit opiate use. Results demonstrate an S-shaped, 24-hour trough plasma methadone concentration response curve with effective concentrations, EC90 = 80 micrograms/L, EC98 = 600 micrograms/L. Plotting mean plasma methadone concentration versus dose gives a monotonically increasing function: Conc = 5.367*dose0.858, raw R-squared = 0.967, corrected R-squared = 0.802. Unfortunately, coefficients of variation for plasma concentrations at each prescribed dose are unacceptably large, explaining poor dose response relationships for some patients.

Maddux, J. F., Prihoda, T. J., & Vogtsberger, K. N. (1997). The relationship of methadone dose and other variables to outcomes of methadone maintenance. American Journal of the Addictions, 6, 246-255.

The authors evaluated the relationship of methadone dose to retention in treatment and to urine tests for morphine and cocaine in a cohort of 610 opioid users admitted to methadone maintenance and followed for 1 year. Methadone dosing was flexible, with patient participation in dose decisions. The maximum dose during treatment ranged from 10 mg to 110 mg, with a mean of 52 mg. Higher doses were associated with increased retention through the dose range of 60 mg-69 mg. Dose was not related to the likelihood of a positive morphine test but was related to the likelihood of a positive cocaine test. In this study, with flexible dosing and patient participation in dose decisions, patients were retained on methadone about as well as was reported in a previous study with patients on a fixed dose of 80 mg.

Margolin, A., Avants, S. K., & Kosten, T. R. (1996). Abstinence symptomatology associated with cessation of chronic cocaine abuse among methadone-maintained patients. American Journal of Drug and Alcohol Abuse, 22, 377-388.

The authors assessed cocaine abstinence symptomatology in a sample of 100 cocaine-abusing, methadone-maintained patients who completed an anonymous questionnaire retrospectively rating the intensity of 18 symptoms at six time points, from 30 minutes to 2 weeks, post-cocaine use. A majority of the patients endorsed symptoms related to dysphoria 24 hours post-binge. However, these symptoms tended to be mild to moderate in intensity and relatively short-lived. Principal components analyses extracted four factors accounting for 64 percent of the variance: psychoticism, exhaustion, agitation, followed by recovery for the duration of the period assessed. (Author abstract modified)

Schottenfeld, R. S., Pakes, J. R., Oliveto, A., Ziedonis, D., & Kosten, T. R. (1997). Buprenorphine vs. methadone maintenance treatment for concurrent opioid dependence and cocaine abuse. Archives of General Psychiatry, 54, 713-720.

Buprenorphine, a partial mu-agonist and kappa-antagonist, has been proposed as an alternative to methadone for maintenance treatment of opioid dependence, especially for patients with concurrent cocaine dependence or abuse. This study evaluated whether higher maintenance doses of buprenorphine and methadone are superior to lower doses for reducing illicit opioid use and whether buprenorphine is superior to methadone for reducing cocaine use. A total of 116 subjects were randomly assigned to 1 of 4 maintenance treatment groups involving higher or lower daily doses of sublingual buprenorphine (12 or 4 mg) or methadone (65 or 20 mg) in a double-blind, 24-week clinical trial. Outcome measures included retention in treatment and illicit opioid and cocaine use as determined by urine toxicology testing and self-report. There were significant effects of maintenance treatment on rates of illicit opioid use, but no significant differences in treatment retention or the rates of cocaine use. The rates of opioid-positive toxicology tests were lowest for treatment with 65 mg of methadone (45%), followed by 12 mg of buprenorphine (58%), 20 mg of methadone (72%), and 4 mg of buprenorphine (77%), with significant contrasts found between 65 mg of methadone and both lower-dose treatments and between 12 mg of buprenorphine and both lower-dose treatments. Results support the superiority of higher daily buprenorphine and methadone maintenance doses vs. lower doses for reducing illicit opioid use, but the results do not support the superiority of buprenorphine compared with methadone for reducing cocaine use. (Author abstract modified)

Tennant, F., & Shannon, J. (1995). Cocaine abuse in methadone maintenance patients is associated with low serum methadone concentrations. Journal of Addictive Diseases, 14, 67-74.

Cocaine abuse in methadone maintenance patients has emerged as a significant clinical problem. To determine if raising the daily methadone dosage is an effective way to eliminate cocaine abuse, 74 methadone maintenance patients maintained at daily dosages between 30 and 80 mg and who chronically abused cocaine were studied by a standard protocol. A total of 21 (28.4%) subjects ceased cocaine abuse when their methadone dosage was progressively raised to a maximal daily dose of 160 mg. Cocaine abuse appeared to accelerate elimination of methadone, since inadequate methadone serum concentrations (below 100 ng/ml) were found in 48 of 67 (71.6%) subjects tested 24 hours after a 100 mg oral methadone dose. Although cocaine abuse in methadone maintenance patients may respond to raising the daily methadone dosage, alternative treatments for cocaine abuse in methadone maintenance patients must be identified since cocaine abuse may lower serum methadone concentrations.

Woody, G. E., McLellan, A. T., Luborsky, L., & O'Brien, C. P. (1990). Psychotherapy and counseling for methadone-maintained opiate addicts: Results of research studies. In L. S. Onken & J. D. Blaine (Eds.), Psychotherapy and counseling in the treatment of drug abuse (NIDA Research Monograph No. 104, pp. 9-23). Rockville, MD: National Institute on Drug Abuse.

Many drug treatment programs, especially methadone maintenance, include some sort of psychotherapy in their treatment regime. Studies have shown that this type of therapy is especially helpful for those addicts with psychiatric problems and can also be useful in reinforcing anti-drug use behavior. Psychotherapy cannot be used to "cure" drug addicts; it should be used in conjunction with other therapies.

3. SPECIAL POPULATIONS

3.1 Alcohol

Anglin, M. D., Almog, I. J., Fisher, D. G., & Peters, K. R. (1989). Alcohol use by heroin addicts: Evidence for an inverse relationship: A study of methadone maintenance and drug-free treatment samples. American Journal of Drug and Alcohol Abuse, 15, 191-207.

This study examines the relationship between the patterns of use of alcohol and heroin by narcotic addicts, and evaluates the hypothesis—frequently reported during methadone maintenance—that this form of treatment can be causally implicated in an increased consumption of alcohol. Data were obtained on lifetime patterns of alcohol and heroin use of 375 Anglo and Chicano male addicts sampled from two treatment sources: the non-methadone (drug-free) California Civil Addict Program (CAP) and several Southern California Methadone Maintenance (MM) programs. Repeated-measures Multiple Analysis of Variances (MANOVAs) revealed that alcohol and heroin consumption were inversely related throughout the addicts' careers. This pattern was evident in the addiction, treatment, and post-discharge stages of Anglo and Chicano addict careers, in both the CAP and MM samples. Consequently, the authors reject the hypothesis that increased alcohol consumption is caused solely by addicts' participation in methadone maintenance treatment. Rather, the findings suggest that addicts' alcohol use during methadone maintenance reflects a lifetime pattern of increased alcohol use following any decline in heroin intake.

Bickel, W. K., Marion, I., & Lowinson, J. (1987). The treatment of alcoholic methadone patients: A review. Journal of Substance Abuse Treatment, 4, 15-19.

Alcoholism is a major problem among methadone maintenance patients. Although alcoholism in the methadone patient is recognized as a problem, few treatment studies have been conducted. Treatment studies have examined abstinence oriented and controlled drinking therapies, voluntary disulfiram treatment, and combined behavioral-pharmacological treatment. The first three treatments were shown to be ineffective in impacting alcohol consumption. The ineffectiveness reported by these studies was attributed to patients' lack of motivation. However, the combined behavioral-pharmacological treatment, which made methadone treatment contingent on antabuse consumption, resulted in decreases in both alcohol consumption and arrests, with increases occurring in employment. Future research should examine the generality of the findings from combined treatment as well as examine whether other contingency management procedures may reduce alcohol consumption in the alcoholic methadone patient.

Chatham, L. R., Rowan-Szal, G. A., Joe, G. W., Brown, B. S., & Simpson, D. D. (1995). Heavy drinking in a population of methadone-maintained clients. Journal of Studies on Alcohol, 56, 417-422.

The purpose of this study was to clarify the relationship between heavy use of alcohol and response to methadone treatment. A sample of clients showing three or more DSM-III-R symptoms (N=79) were identified and compared with a sample of heavy-drinking clients (N=108) with less than three alcohol dependency symptoms on admitting characteristics and on tenure in treatment. As expected, clients meeting DSM-III-R dependency criteria were significantly more likely to show evidence of psychological problems and dysfunction of family and peer relations at admission. An unexpected finding was that they were also more likely to remain in treatment longer than clients who did not report dependency. Alcohol-dependent clients were significantly more likely to have prior experience with self-help groups, which may reflect less denial and therefore relatively better ability to focus on opiate dependency problems. Failure to differentiate between alcohol-dependent and nondependent groups of drinkers enrolled in methadone treatment may help account for reported differences in treatment outcome studies. Recognizing these different types of drinkers also may help clinicians plan more effective treatments. (Author abstract modified)

Herd, D. (1993). Correlates of heavy drinking and alcohol-related problems among men and women in drug-treatment programs. Drug and Alcohol Dependence, 32(1), 25-35.

A series of analyses were conducted to explore if there were significant differences in heavy drinking and alcohol-related problems in clients admitted to different types of drug-treatment programs and whether such differences, if found, could be attributed to variation in social characteristics, drug use behavior, drinking norms, drinking contexts, or in reasons for combining alcohol and drug use. Men and women (N=246) in four types of publicly funded treatment programs were interviewed at intake regarding drinking and drug-use patterns and related problems. The results of the study showed significant differences in drinking behavior and alcohol-related problems of clients in different treatment modalities. Men in a county jail substance abuse program exhibited the highest frequency of heavy drinking and highest rates of alcohol problems; clients of methadone programs reported the lowest rates, and those in therapeutic communities described intermediate rates. A series of regression analyses showed that the only significant predictors of the frequency of heavier drinking and drunkenness were drinking context and reasons for combining alcohol and drug use. In addition, age (youthfulness) was associated with the frequency of getting drunk. The most powerful predictors of alcohol-related problems were the frequency of getting drunk and drinking to enhance the effects of other drugs. Heavy drinking and drinking to prevent getting sick from drugs were also significantly associated with drinking problems. The frequency of drug use (by specific type) and most social characteristics showed no direct association with drinking patterns or problems.

Kreek, M. J. (1984). Opioid interactions with alcohol. In M. J. Kreek, & B. Stimmel (Eds.), Dual addiction: Pharmacological issues in the treatment of concomitant alcoholism and drug abuse (pp. 35-46). New York: The Haworth Press.

Concomitant alcohol and narcotic abuse, and also combined addictive diseases or narcotic addiction and alcoholism are very common. Interactions of both a pharmacodynamic and also dispositional type may occur between ethanol and either the short-acting exogenous opioids, such as heroin and morphine, or the long-acting exogenous opioid, methadone. Over half of the so-called "overdose" cases in which exogenous opioids (heroin or methadone) are implicated, are in fact cases in which concomitant abuse of alcohol has played a prominent role. Extensive studies have been carried out to determine factors which may alter the disposition of the long-acting exogenous opioid, methadone, which can be used successfully in the maintenance treatment of addiction. Chronic use of methadone, administered orally, can result in a steady state with respect to both drug levels and overall functioning. Many different physiological systems may be altered by acute or chronic use of short-acting narcotics such as heroin or morphine. Normalization of these functions occurs in the chronic-steady state of long-term methadone treatment. However, many factors including chronic liver disease and use and abuse of other drugs, including alcohol, may alter this steady state. Studies have been carried out to determine the dispositional interactions between ethanol and methadone both in humans and in animal models. Also, studies have been carried out to determine the effects of liver disease, that may result from alcohol abuse and/or sequelae of viral hepatitis infection on methadone disposition. Any factor that alters exogenous opioid disposition, specifically the steady state that may be achieved during chronic methadone maintenance treatment, may cause drug hunger and therefore drug-seeking behavior. Interactions between ethanol and methadone and also probably between ethanol and heroin may be major factors in contributing to the concomitant addictive diseases of narcotic addiction and alcoholism and also may contribute to persistent illicit drug use of a narcotic or non-narcotic type in patients receiving methadone treatment for heroin addiction. Treatment goals for the future are discussed in this report. (Author abstract)

Obuchowsky, M., & Zweben, J. E. (1987). Bridging the gap: The methadone client in 12-step programs. Journal of Psychoactive Drugs, 19, 301-302.

Methadone maintenance clients are often considered inappropriate for 12-step programs because they are viewed as being "on drugs." This attitude reflects the misunderstandings concerning methadone maintenance as a treatment modality and creates barriers for clients who wish to use a 12-step program as a support system to get off methadone or to come to grips with their use of alcohol and/or other drugs. The value of a 12-step program for clients on methadone maintenance is demonstrated through an interview where such a client shares her views. The gulf separating these clients from those involved in 12-step recovery programs is slowly becoming narrower. For some, these programs will provide a crucial support structure to facilitate detoxification and a transition to abstinence. For others, methadone has made major lifestyle changes possible, but they may not be ready or able to taper off without putting their gains at serious risk. Many of these clients are finding 12-step programs to be of enormous value in continuing to build on their changes.

Sells, S. B., & Simpson, D. D. (1988). Role of alcohol use by narcotic addicts. *Brown* University Digest of Addiction Theory and Application, 7(1), 63-65.

This report addresses the relationship between drugs and alcohol before, during, and after drug abuse treatment. It is based on several studies of the Drug Abuse Reporting Program (DARP), a national evaluation research program. DARP covers 44,000 clients in 52 programs in the Federal abuse treatment system across the country between 1969 and 1974 with post treatment follow-up of 6 and 12 years after admission to treatment. Although alcohol use increased after DARP treatment, it was not viewed as a heroin substitute and, for the majority of clients, alcohol use was moderate. Lowest alcohol use was by the methadone maintenance treatment group.

3.2 Criminal Justice

Bell, J., Mattick, R., Hay, A., Chan, J., & Hall, W. (1997). Methadone maintenance and drug-related crime. Journal of Substance Abuse, 9, 15-25.

Using data from an evaluation of methadone maintenance treatment, this study investigated factors associated with continued involvement in crime during treatment, and in particular whether there appeared to be differences in effectiveness of treatment between different methadone clinics. The methodology was an observational study, in which 304 patients attending three low-intervention private methadone clinics in Sydney, Australia, were interviewed on three occasions over a 12-month period. Outcome measures were self-reported criminal activity and police department records of convictions. By self-report, crime dropped promptly and substantially upon entry to treatment, to a level of acquisitive crime about one-eighth of that reported during the last addiction period. Analysis of the official records indicated that rates of acquisitive convictions were significantly lower in the in-treatment period compared to the prior-to-entry-into-treatment period, corroborating the changes suggested by self-report. Persisting involvement in crime while in treatment was predicted by two factors: the cost of persisting use of illicit drugs, particularly cannabis, and ASPD symptom count. Treatment factors also were independently predictive of continued involvement in crime. By both self-report and official records, and adjusting for subject factors, treatment at one clinic was associated with greater involvement in crime. This clinic operated in a chaotic and poorly organized way. It is concluded that crime during methadone treatment is substantially lower than during street addiction, although the extent of reduction depends on the quality of treatment being delivered.

California Department of Alcohol and Drug Programs. (1994). Evaluating recovery services: California drug and alcohol treatment assessment (CALDATA). General report. Sacramento: Author.

Substance abusers treated in California's public treatment system in 1991 reduced their criminal activity and health utilization during and in the year subsequent to treatment by amounts worth well over $1.4 billion. About $209 million was spent providing this treatment, for a ratio of benefits to costs of 7 to 1. These findings were based on analyses of data representative of nearly 150,000 persons treated for alcohol, drug, or combined problems in inpatient (residential and social model) and ambulatory (outpatient and methadone) treatment settings. For the average person who completed treatment during the reference period, benefits of about $10,000 were realized for a treatment that lasted 95 days and cost about $1,360. Also, treatment for participants who remained continuously enrolled in methadone programs realized a savings approaching $11,000 per person per year at a cost of $2,325 for that period. These savings included reduced criminal justice expenses (police protection, adjudication, and corrections), reductions in victim losses (stolen and damaged property, injuries, and lost work), and generally lower levels of health care utilization (hospitalizations, emergency room use, and outpatient care)—but savings were offset by modest increases in welfare and disability dependence as well. This analysis has generally used the method employed in "cost effect" studies of substance abuse treatment. Health-care expenditures were only a small part of total costs in this study. It was found that annual per capita health-care expenditures declined $758 for discharged participants from $3,227 before treatment to $2,469 after treatment. Therefore, health-care benefits in 1 year after discharge alone "offset" about 55 percent of the cost of a treatment episode. There appeared to be only minor differences in health-care benefits across the various types of treatment, thus the "offsets" for residential and social model treatments were smaller than for outpatient and discharged methadone participants. A major finding of this analysis is that, regardless of the modality of care, treatment-related economic savings overweighed costs by at least 4 to 1 (inpatient settings) and appeared to be greater than 10 to 1 for outpatient and discharged methadone participants. For residential and social model care, benefits during treatment barely covered the costs of providing care—however, benefits following treatment were substantial.

Dolan, K., & Wodak, A. (1996). An international review of methadone provision in prison. Addiction Research, 4, 85-97.

Methadone treatment in prison is reviewed, as are alternative drug treatments for inmates and service provision in prison. It is suggested that prison methadone maintenance treatment (PMMT) is likely to offer most of the benefits of community methadone maintenance treatment (MMT) programs without significant additional problems from adaptation of MMT to the prison environment. The effectiveness in reducing heroin use, criminality, and the spread of HIV, are discussed as well as safety, minimal side effects, and low cost of community. Methadone maintenance treatment programs have become increasingly accepted in the last decade. Such programs in recent years have been implemented in a growing number of countries that had been previously opposed to this form of treatment. And in countries such as Australia, where MMTs were well accepted, they have been expanded and liberalized. However, prison methadone maintenance programs exist in only a few countries. Evidence of the magnitude of transmission of blood borne viral infections in prison or of the potential to avert such infection by PMMT is urgently needed. Methadone can be prescribed in prison settings for detoxification, pre-release, and maintenance. Drug injecting is less frequent inside prison than in the community, but each episode of injecting inside is probably far more hazardous regarding transmission of infectious agents such as HIV, hepatitis B, and hepatitis C. Inmates in a PMMT program are easier to manage and therefore less likely to riot. Methadone has been used in prison in seven countries for detoxification and for maintenance in five countries.

Dole, V. P. (1976). Management of the opiate abstinence syndrome. In P. G. Bourne (Ed.), Acute drug abuse emergencies (pp. 63-68). New York Academic Press.

Detoxification of a narcotic-dependent person can be managed quite easily by gradual reduction in dose of methadone. About 1 week is the minimum period for detoxification of a heroin addict. All new prison inmates are examined by a physician upon entry. If the physician finds an inmate to be physically dependent on narcotics, methadone detoxification is offered. If the inmate accepts treatment, the first of 13 doses is given immediately and the dosage schedule is stamped on the medical card. The inmate is referred to the detoxification floor during treatment. With adolescents, a lower initial dose is recommended; as with adults, overtreatment is a greater danger than undertreatment. The dispensing of methadone is kept under rigorous control; each inmate is observed while drinking the dose, discarding the cup, and swallowing the medication. A physician is available at the morning session to change the prescription or to prescribe other medications, as needed. Problems encountered may include vomiting the initial dose of methadone, constipation, insomnia, and/or anxiety. Corrections officers assigned to the detoxification unit should have a firm but sympathetic attitude toward the prisoners. This program has been very successful at one prison; it has been in place for 16 months, during which 40,000 addicts were detoxified with no major incidents of violence or attempted suicide.

Dole, V. P., Nyswander, M. E., & Warner, A. (1981). Successful treatment of 750 criminal addicts. In H. Shaffer & M. E. Burglass (Eds.), Classic contributions in the addictions (pp. 412-420). New York, NY: Brunner/Mazel.

A four-year trial of methadone blockage treatment has shown 94 percent success in ending the criminal activity of former heroin addicts. The majority of these patients are now productively employed, living as responsible citizens, and supporting families. The results show unequivocally that criminal addicts can be rehabilitated by a well-supervised maintenance program.

Hall, W., Bell, J., & Carless, J. (1993). Crime and drug use among applicants for methadone maintenance. Drug and Alcohol Dependence, 31, 123-129.

The relationship between crime and drug use was examined in 313 Australian opioid addicts who applied for entry to methadone treatment. More than 90 percent of them had reported one or more convictions for property or drug offenses. Subjects' self-reported convictions were moderately correlated with convictions recorded by the police. Men were more likely to begin their opioid use at or after their first criminal conviction, while women were more likely to begin offending after they used opioids. The rate at which subjects accrued convictions for property offenses declined as they grew older, and the earlier a subject's first exposure to the criminal justice system the higher the rate at which they accrued convictions.

Hunt, D.E. Lipton, D.S. and Spunt, B. (1984) Patterns of criminal activity among methadone clients and current narcotics users not in treatment. Journal of Drug Issues, 14, 687-702.

The purpose of the study was to assess whether or not narcotics addicts reduce their criminal activity when they enter methadone maintenance treatment? Compared were N=368 methadone maintenance clients and N=142 narcotics addicts who are not currently in treatment.Methadone clients engaged in significantly lower amounts of property ($p<.1$) and drug dealing crimes ($p<.001$) than narcotics users not in treatment. Both groups had similar amounts of drug related arrests in the past (prior to treatment), but the methadone clients had higher average number of past personal and property crime arrests. With age differences controlled, the differences were no longer evident for all but the most criminally active clients i.e. age 20-30. Thus, methadone clients are not different in their offender backgrounds from the untreated addicts. Unemployment and cocaine use were positively correlated with criminal activity among methadone clients.

Leukefeld, C. G., & Tims, F. M., eds. (1992). Drug abuse treatment in prisons and jails (NIDA Research Monograph No. 118). Rockville, MD: National Institute on Drug Abuse.

Drug abuse treatment in jails and prisons is discussed. An overview is provided of correctional drug abuse treatment in the United States. Program models and initiatives for the 1990s concerning drug abuse treatment programs in the Federal Bureau of Prisons are outlined. The presence of HIV infection in the correctional setting is examined. A demonstration drug abuse treatment program for inmates and parolees is described. One experience with substance abuse services for juvenile offenders also is described. Experiences with substance abuse programs that have been developed in Florida, Wisconsin, and Oregon corrections department are included. An outcome evaluation of a prison therapeutic community for substance abuse treatment is presented. Obstacles to the implementation and evaluation of drug treatment programs in correctional settings are discussed, using problems faced in Delaware as an example. An evaluation also is presented of in-jail methadone maintenance and management of the drug-abusing offender.

3.3 Dually Diagnosed Patients

Alterman, A.I., Rutherford, M.J., Cacciola, J.S., McKay, J.R., & Woody, G.E. (1996). Response to methadone maintenance and counseling in antisocial patients with and without major depression. Journal of Nervous and Mental Disease, 184, 695-702.

This study compared the treatment response of opiate-dependent, methadone maintained patients receiving drug counseling. Patients were grouped as opiate dependent only; opiate dependent with a lifetime diagnosis of depression; opiate dependent with concurrent antisocial personality and lifetime major depression; and opiate dependent with comorbid antisocial personality. All groups evidence concurrent use of alcohol and other drugs. Patients were assessed at intake, during treatment, and seven months after treatment admission on treatment compliance, urine toxicology results, and Addiction Severity Index status. During treatment, results show positive urine toxicology for all groups for benzodiazepines, cocaine, opiate, or amphetamines. Urine toxicology at seven month follow-up showed significant differences in drug and alcohol use between the antisocial personality disorder only group and the other three opiate-dependent groups. Data show considerable improvement for all groups in the drug area and varying degrees of improvement in the legal, psychiatric, employment, family/social, and alcohol areas. The antisocial personality reported more improvement than the other opiate-dependent groups. Results show considerable evidence that both groups of antisocial personality subjects showed significant gains associated with methadone maintenance and drug counseling.

Brooner, R., King, V., Kidorf, M., Schmidt, C., & Bigelow, G. (1997). Psychiatric and substance use comorbidity among treatment-seeking opioid abusers. Archives of General Psychiatry, 54(1), 71-80.

Major studies of psychiatric comorbidity in opioid abusers reported rates of comorbidity that far exceeded general population estimates. These studies were published more than a decade ago and reported on few women and few substance use diagnoses. Psychiatric and substance use comorbidity was assessed in 719 opioid abusers seeking methadone maintenance. Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition diagnostic assessment was conducted one month after admission. Rates of psychiatric and substance use disorder were compared by gender, and associations were assessed between psychiatric comorbidity and dimensional indexes of substance us severity, psychosocial impairment, and personality traits. Psychiatric comorbidity was documented in 47 percent of the sample (47% women and 48% men). Antisocial personality disorder (25%) and major depression (16%) were the most common diagnoses., Patients had at least two substance use diagnoses, most often opioid and cocaine dependence. Demographics, substance use history, and personality variables discriminated between patients with versus without comorbidity also was associated with a more severe substance user disorder. Psychiatric comorbidity, especially personality and mood disorder, was common in men and women. The positive associations between psychiatric comorbidity and severity of substance use and other problems were most constant among those with antisocial personality. (Author abstract modified)

Calsyn, D. A., Fleming, C., Wells, E. A., & Saxon, A. J. (1996). Personality disorder subtypes among opiate addicts in methadone maintenance. Psychology of Addictive Behaviors, 10, 3-8.

The Million Clinical Multiaxial Inventory was administered to 196 men and 113 women newly admitted to methadone maintenance. The distribution of participants among Axis I subtypes was no elevation (18.8%), drug-alcohol abuse only (25.2 %), affective disturbance (31.7%), and psychotic symptoms (17.2%); among Axis II subtypes it was no elevation (10.4%), narcissistic-antisocial (36.2%), dependent (16.2%), withdrawn-negativistic (12.6%), histrionic (7.4%), and severe personality disorder (8.4%). Women were more likely to be assigned to histrionic, dependent, and severe personality disorder subtypes. Proportionately more black participants were assigned to drug/alcohol only, psychotic symptoms, narcissistic/antisocial, and severe personality disorder subtypes. The proportion retained in treatment at 18 months was higher for withdrawn (.51) and histrionic (.33) than other Axis II subtypes (range = .13-.22).

Magura, S. Kang, S., Rosenblum, A., Handelsman, L., Foote, J. (1998a) Gender differences in psychiatric comorbidity among cocaine-using opiate addicts.

Psychiatric comorbidity was examined for a sample of 212 methadone patients dually addicted to opiates and cocaine, focusing on gender differences. Diagnoses were determined by the SCID for DSM-III-R. Men displayed more lifetime (but not current) substance use disorders, while women displayed more lifetime and current non-substance use disorders. There were several significant interactions among psychiatric disorders and gender. Women were more likely than men to present with concurrent mood and anxiety disorders. Women with ASPD were unlikely to have alcohol use disorder., but likely to have opioid use disorder. Men with anxiety were likely to be diagnosed with ASPD.

Milby, J.S., Sims, M.K., Khuder, S., Schumacher, J.E., Huggins, N., et al. (1996). Psychiatric comorbidity: Prevalence in methadone maintenance treatment. American Journal of Drug and Alcohol Abuse, 22(1), 95-107.

This study examines prevalence rates for DSM-III-R anxiety and affective disorders in three follow-up samples of opioid addicts who were treated with methadone maintenance. At least one anxiety disorder was diagnosed in 55 percent of the total sample. Affective disorders were found in 58 percent. At least one anxiety disorder coexisted with at least one affective disorder in 46 percent of the sample. The research demonstrated that opiate addiction in this sample is most often associated with other comorbid psychopathology. It suggests a need for thorough assessment for general psychopathology in opioid addicts entering addiction treatment, especially assessment for anxiety and affective disorders. The research also suggests the need for treatment that focuses on diagnosed mental disorders in addition to drug counseling for the substance abuse disorder. (Author abstract modified)

O'Brien, C. P., Woody, G. E., & McLellan, A. T. (1995). Enhancing the effectiveness of methadone using psychotherapeutic interventions. In L. S. Onken, J. D. Blaine, & J. J. Boren (Eds.), Integrating behavioral therapies with medications in the treatment of drug dependence (NIDA Research Monograph No. 150, pp. 5-18). Rockville, MD: National Institute on Drug Abuse.

There is consistent evidence that the efficacy of methadone can be enhanced by psychotherapeutic interventions. For individual psychotherapy, the increased efficacy is most demonstrable among methadone patients also suffering from psychiatric disorders. Patients with severe psychiatric problems generally show little response to drug counseling alone. There is no evidence of a consistent advantage of one type of psychotherapy over another. Contingency contracting using take-home doses of methadone to reinforce drug-free urine samples has been shown to be effective, at least over the short term. Rewarding clean urine samples by vouchers exchangeable for retail items is supported by a growing experimental database, although practical issues remain for publicly funded methadone programs. The use of methadone doses as reinforcement has shown some efficacy, but there are both ethical and conceptual problems. Finally, while there are likely to be some benefits from simply administering methadone alone in the most economical way, the available evidence clearly shows that a relatively minor investment in counseling, individual psychotherapy, or contingency contracting can result in major improvements in the results of this medication.

Pechter, B. M., Janicak, P. G., & Davis, J. M. (1997). Psychopharmacotherapy for the dually diagnosed: Novel approaches. In N. S. Miller (Ed.), Principles and practice of addictions in psychiatry (pp. 521-531). Philadelphia, PA: W. B. Saunders Company.

This chapter discusses pharmacotherapeutic approaches for populations with a dual diagnosis of mental disorders and addictive illness. It is noted that diagnosis must be able to determine whether the psychiatric disorder is underlying the addictive disorder or resulting from the addictive disorder. Discussion of the psychopharmacotherapy for specific psychiatric disorders focuses on psychotic disorders (including schizophrenia) and the use of opiate antagonists, disulfiram, and methadone; mood disorders and the use of tricyclic antidepressants and selective serotonin reuptake inhibitors; bipolar disorder, with a focus on mood-stabilizing agents such as lithium; and anxiety-related disorders, which are a common complaint complicating recovery from addictive disorders. Decision-making charts for when or whether to use pharmacotherapy are provided for psychosis, unipolar or bipolar depression, and anxiety disorders.

3.4 HIV/AIDS

Anglin, M. D., Miller, M. L., Mantius, K., & Grella, C. (1993). Enhanced methadone maintenance treatment: Limiting the spread of HIV among high-risk Los Angeles narcotics addicts. In J. A. Inciardi, F. M. Tims, & B. W. Fletcher (Eds.), Innovative approaches in the treatment of drug abuse: Program models and strategies (pp. 3-19). Westport CT: Greenwood Press.

Los Angeles has the second largest population of intravenous drug users (IVDUs) in the U.S. Unlike New York City, where 50 percent of in-treatment IVDUs are infected with HIV, in Los Angeles, only 3 percent of those in treatment have the AIDS virus. This low infection rate is not because of low-risk behavior. Eighty percent of IVDUs share needles and many share needles knowingly with those who have had homosexual encounters. Rigorous interventions need to be developed so that there is not an explosion in HIV rates. Enhanced methadone maintenance provides a framework for those interventions.

Batki, S. L. (1990). Drug abuse, psychiatric disorders, and AIDS: Dual and triple diagnosis. Western Journal of Medicine, 152, 547-552.

Substance abuse and psychiatric disorders commonly occur together. This form of dual diagnosis is notable because it complicates assessment and makes treatment more difficult for both psychiatric and drug abuse problems. Drugs can cause psychiatric disorders and can also be used as an attempt to "cure" them by self-medication. The spread of the human immunodeficiency virus (HIV) among drug users has added a third potential clinical problem, that of the acquired immunodeficiency syndrome to the difficulties already presented by drug abuse and psychiatric disorders. Patients with this triple diagnosis pose challenges to primary care physicians as well as addiction medicine specialists or psychiatrists. Assessment should include a drug abuse history, preferably corroborated by others, evaluation of the mental state, and examination focusing on signs of drug abuse and HIV infection. Treatment should include the management of HIV disease, abstinence from drug abuse, and access to psychiatric care. New systems of health care service, including interdisciplinary case management, may be needed to manage patients with a triple diagnosis. (Author abstract)

Ferrando, S. J., Wall, T. L., Batki, S. L., & Sorensen, J. L. (1996). Psychiatric morbidity, illicit drug use and adherence to zidovudine (AZT) among injection drug users with HIV disease. American Journal of Drug and Alcohol Abuse, 22, 475-487.

This study describes the relationship between the need for psychiatric consultation, illicit drug use, and zidovudine (AZT) adherence in HIV-infected injection drug users (IDUs) in methadone maintenance treatment (MMT). The treatment records of 57 IDUs in MMT who had been prescribed AZT between May and August of 1991 were reviewed. Those who required psychiatric consultation (P+, N = 46, 81%) were compared with those who did not require psychiatric consultation (P-, N = 11, 19%) on adherence to AZT treatment (using the mean corpuscular volume [MCV] as a biological marker), on recent illicit drug use, and on CD4 lymphocyte (T cell) count changes from the beginning to the end of AZT treatment. The P+ subjects were less likely than P- subjects to adhere to AZT treatment; fewer in the P+ group had an MCV outside of the normal range, and P+ subjects had a lower average monthly increase in MCV since the beginning of AZT treatment. Recent illicit drug use and CD4 lymphocyte count changes from the beginning to the end of AZT treatment did not show group differences. Psychiatric morbidity among HIV-infected IDUs in MMT is common and may contribute to poor adherence to AZT treatment. Psychiatric screening and adherence-enhancing interventions should be targeted to IDUs entering drug treatment programs. (Author abstract)

Grella, C. E., Anglin, M. D., & Wugalter, S. E. (1995). Cocaine and crack use and HIV risk behaviors among high-risk methadone maintenance clients. Drug and Alcohol Dependence, 37(1),15-21.

A discriminant function analysis was performed with data from 409 high-risk heroin addicts at intake into a methadone maintenance treatment program to determine the characteristics of cocaine users. Cocaine users presented a higher-risk profile for human immunodeficiency virus (HIV), engaged in a wider variety of criminal activities, were more likely to be African American, reported more alcohol use, and showed more signs of psychological disturbance. A second discriminant function analysis determined that crack smokers differed from non-crack cocaine users in ethnicity, alcohol use, criminal activity, needle use, and marital status. Heroin addicts who used cocaine, in particular crack, represent a sub-group at higher risk and in need of targeted treatment planning and monitoring. (Author abstract)

Metzger, D.S., Woody, G.E., McLellan, A.T., O'Brien, C.P. Druly, P., Navaline, H., DePhilippis, D., Stolley, P. and Abrutyn, E. (1993) Human imunodeficiency virus seroconversion among intravenous drug users in-and out-of-treatment: an 18 month prospective follow-up. Journal of Acquired Immune Deficiency Syndromes, 6, 1049-1056.

The study objective was to determine the prevalence and incidence of HIV infection and related risk behaviors among opiate-abusing intravenous drug users (IVDUs) either in or out of methadone treatment. the subjects, 152 in-treatment and 103 out-of-treatment intravenous opiate users, were followed prospectively for 18 months. Behavioral and serologic assessments were made at 6-month intervals, with complete information available on 89 percent of the sample. Subjects were recruited from a single methadone maintenance program and the surrounding neighborhood in north-central Philadelphia. At baseline, the HIV seroprevalence rate for the total sample was 12 percent: 10 percent for the methadone-maintained group and 16 percent for the out-of-treatment group. Out-of treatment subjects were injecting drugs, sharing needles, visiting shooting galleries, and practicing unsafe sex at significantly higher rates than in-treatment subjects. Follow-up of HIV-negative subjects over the next 18 months showed conversion rates of 3.5 percent for those who remained in methadone maintenance versus 22 percent for those who remained out of treatment. The sixfold difference in rate of seroconversion between the two groups suggests that although rapid transmission of HIV still occurs, opiate-abusing IVDUs who enter methadone treatment are significantly less likely to become infected. In contrast, those opiate addicts who do not enter treatment are at significantly higher risk of contracting and spreading the disease. (Author abstract modified)

Ruscavage, D., & Santee, B. (1990). A comparative analysis of two methods of AIDS education in a population of methadone and non-methadone taking substance abusers: Preliminary report. New York: Greenwich House.

This report of a study, using a longitudinal, quasi-experimental pre- and post-test design, determines the comparative effectiveness of facilitative (participatory) and didactic (lecture) methods of delivering an AIDS education and HIV prevention program to methadone taking and non-methadone taking injecting drug users (IDUs). Both education programs include role playing, videos, and published materials. The study also yielded baseline information about knowledge and opinions on AIDS, and sexual and drug-taking practices among this population. The measurements were taken immediately preceding education intervention, immediately following educational intervention, and 3 months following educational intervention. The data were analyzed by nine independent variables: type of educational intervention, methadone use or non-use, sex, age, race, sexual orientation, level of education, marital status, and household income. Knowledge, opinion, and safer sexual and drug-taking practices were the dependent variables. An AIDS knowledge scale encompassed three subscales: general AIDS knowledge, sex-related AIDS knowledge, and drug-related AIDS knowledge. The findings indicate that overall knowledge levels were increased as a result of either type of AIDS educational intervention; the intervention had an increasing impact as the general educational level increased. However, the facilitative approach produced a higher increase in all AIDS knowledge scales, for reasons not yet determined. Despite an original hypothesis, methadone users appeared to experience a slightly higher increase in the total AIDS knowledge scale.

3.5 Polydrug Users

Abellanas, L. & McLellan, A.T. (1993). "Stage of change" by drug problem in concurrent opioid, cocaine, and cigarette users. Journal of Psychoactive Drugs, 25, 307-313 .

Within the field of addiction, the majority of work regarding stages and processes of change has focused on single drug problems, such as cigarette smoking or alcohol use; however, the majority of the substance abuse treatment population present with more than one substance use disorder. This article reports on the results of the internal consistency and test-retest reliability of the University of Rhode Island Change Assessment (URICA) in a sample of 41 methadone-maintained, opioid-dependent male veterans who had concurrent problems of cigarette and cocaine dependence. These volunteers were given a URICA for each of their three drug problems, followed by a repeated administration three to five days later. All the stage-of-change scale scores showed excellent internal consistency and stability across the three- to five-day interval for all three drug problems, thus confirming the reliability of the measure in this population. URICA scores were lowest on the precontemplation stage, with higher and approximately equivalent scores on the other three stage measures. Most surprising was that these profile scores were almost identical across the three drugs tested, suggesting limits to the validity of this measure with this population.

Fairbank, J.A., Dunteman, G.H., & Condelli, W.S. (193). Do methadone patients substitute other drugs for heroin? Predicting substance use at one-year follow-up. American Journal of Drug and Alcohol Abuse, 19, 465-474.

Data were analyzed from the nationwide Treatment Outcome Prospective Study (TOPS) to assess whether current and former methadone patients substitute other drugs for heroin. The sample comprised 513 heroin users who were admitted to methadone programs in 10 cities across the United States and followed for at least one year. Structured face-to-face interviews were administered at admission and at follow-up to assess use of six substances: cocaine, amphetamines, illegal methadone, tranquilizers, marijuana, and alcohol. The study found a decline in the use of all substances except alcohol. Patients who substantially reduced or eliminated their use of heroin during the follow-up year were more likely to decrease their use of other drugs than were patients who continued to use heroin on a weekly or more frequent basis. These findings suggest that methadone programs indirectly reduce patients' use of cocaine, amphetamines, illegal methadone, tranquilizers, and marijuana, insofar as they are successful in eliminating or decreasing heroin use. Similar reductions in drug use were found among patients who were not enrolled in methadone programs during the follow-up year. These findings do not support the commonly held belief that heroin addicts substitute other drugs for heroin.

Gollnisch, G. (1997). Multiple predictors of illicit drug use in methadone maintenance clients. Addictive Behaviors, 22, 353-366.

Many drug users in methadone maintenance treatment continue to use a variety of illicit drugs. The present study tested a hierarchical, multidimensional model to predict concurrent substance use in methadone maintenance clients. The model incorporated measures of demographics, personality, coping, motivation, and methadone beliefs. Subjects were 94 male and female injecting drug users in methadone treatment. Using multiple regression, results showed that a model incorporating all the predictors accounted for 51 percent of the variance in self-reported drug use. The study highlights the importance of using multidimensional models to study the complex factors involved in drug use.

Grella, C.E., Anglin, M.D., & Wugalter, S.E. (1997). Patterns and predictors of cocaine and crack use by clients in standard and enhanced methadone maintenance treatment. American Journal of Drug and Alcohol Abuse, 23(1), 15-42.

This paper reports on the patterns of cocaine use among subjects (N=427) admitted to a methadone maintenance treatment demonstration project designed to reduce risk for HIV. Assessments were conducted at intake and at approximately 18-24 months after treatment admission. Self-reported data on cocaine use was compared with results of urinalysis tests at both intake and follow-up; 29 subjects who falsely reported no use were recorded as users. Over one-third used some form of cocaine at both intake and follow-up, while approximately 30 percent abstained at both points. Approximately 20 percent ceased as well as initiated cocaine use between intake and follow-up. Use of powder cocaine, either alone or combined with heroin in "speedballs," decreased at follow-up, whereas crack use increased. Discriminant function analyses were performed to determine the predictors of the different patterns of cocaine use by type. Receipt of enhanced methadone treatment compared with standard methadone treatment, treatment duration, or average duration of counselor contact appeared unrelated to cocaine use. Cocaine use at follow-up was associated with polydrug and alcohol use, illegal activity, a negative emotional state, and sex work. Crack users were more likely to be African American than nonusers; continuous users of powder cocaine were more likely to also be using heroin than were nonusers; and continuous speedball users were more likely to be women sex workers with high levels of depression. This analysis demonstrated that cessation or continuation of cocaine use after entry into methadone maintenance treatment is not uniform across different types of cocaine.

Hartel, D. M., Schoenbaum, E. E., Selwyn, P. A., Kline, J., Davenny, K., Klein, R. S., & Friedland, G. H. (1995). Heroin use during methadone maintenance treatment: The importance of methadone dose and cocaine use. American Journal of Public Health, 85, 83-88.

The purpose of this study was to examine factors associated with heroin use during methadone maintenance treatment. Logistic regression statistical models were used to examine data obtained in a cross-sectional sample of 652 methadone patients. Heroin use during the 3 months prior to interview was shown to be greatest among patients maintained on methadone dosages of less than 70 mg/day (adjusted odds ratio [OR] = 2.1, 95% confidence interval [CI] = 1.3, 3.4) and patients who used cocaine during treatment (adjusted OR = 5.9, 95% CI = 3.8, 9.1). These results were independent of treatment duration, treatment compliance, alcohol use, and socioeconomic factors. Cocaine users were more likely than nonusers of cocaine to use heroin at all methadone dosage levels. This study confirms and extends past research showing high-dose methadone maintenance to be important to heroin abstinence. Further investigation of the independent association between heroin use and cocaine use is needed. (Author abstract modified)

Rosenblum, A., Magura, S., Foote, J., Palij, M., Handelsman, L., Lovejoy, M., & Stimmel, B. (1995). Treatment intensity and reduction in drug use for cocaine-dependent methadone patients: A dose-response relationship. Journal of Psychoactive Drugs, 27(2), 151-159.

This study examined the impact of treatment intensity on cocaine use. Seventy-seven cocaine-using methadone patients were enrolled in a six-month, structured, manual-driven, cognitive-behavioral treatment program. Sessions consisted of five individual and/or group sessions per week. At intake subjects showed extensive polydrug abuse, psychiatric comorbidity, criminal histories, and HIV risk behaviors. Treatment intensity was measured by dividing number of sessions attended into quartiles. Paired comparisons, within treatment quartiles, were made between subjects' intake and six-month self-reports of cocaine use. Subjects in quartiles two through four showed significant reductions in frequency of cocaine use at follow-up, with subjects who received the most treatment showing the greatest reductions in cocaine use. Bivariate and multivariate analyses showed that treatment sessions attended remained a strong predictor of reduction in cocaine use at follow-up, even after controlling for drug use at intake and background variables. The results indicate that there is a substantial treatment dose-response relationship.

Shaffer, H.J., & LaSalvia, T.A. (1992). Patterns of substance use among methadone maintenance patients: Indicators of outcome. Journal of Substance Abuse Treatment, 9(2), 143-147.

Critics often cite the use of illicit drugs among methadone maintenance patients as evidence of this treatment modality's failure. The fact that methadone maintenance treatment does not lead quickly to abstinence in most clients can be a disappointment to treatment professionals and the public. By studying a cohort of 41 patients for their first year in a methadone maintenance program, this study revealed significant trends of diminished narcotic and cocaine use. However, increased benzodiazepine use was also identified. More importantly, this study patterns of drug using that predicted less drug use at the end of one year of treatment. These findings reflect the need for additional research to clarify the meaning of illicit drug use by methadone maintenance patients. In addition, the implications for providing, stopping, and determining effective drug treatment are discussed.

Silverman, K., Higgins, S.T., Brooner, R.K., Montoya, I.D., Cone, E.J., Schuster, C.R., & Preston, K.L. (1996). Sustained cocaine abstinence in methadone maintenance patients through voucher-based reinforcement therapy. Archives of General Psychiatry, 53, 409-415 .

Chronic cocaine abuse remains a serious and costly public health problem. This study assessed the effectiveness of a voucher-based reinforcement contingency in producing sustained cocaine abstinence. A randomized controlled trial compared voucher-based reinforcement of cocaine abstinence to noncontingent voucher presentation. Patients were selected from 52 consecutively admitted injecting heroin abusers in a methadone maintenance treatment program. Patients with heavy cocaine use during baseline period (N=37) participated. Except where otherwise indicated, the term cocaine abuse is used in this article in a generic sense and not according to the DSM-III-R definition. Patients exposed to abstinence reinforcement received a voucher for each cocaine-free urine sample (i.e., negative for benzoylecgonine) provided three times per week throughout a 12-week period; the vouchers had monetary values that increased as the number of consecutive cocaine-free urine samples increased. Control patients received noncontingent vouchers that were matched in pattern and amount to the vouchers received by patients in the abstinence reinforcement group. Patients receiving vouchers for cocaine-free urine samples achieved significantly more weeks of cocaine abstinence (P = .007) and significantly longer durations of sustained cocaine abstinence (P = .001) than controls. Nine patients (47%) receiving vouchers for cocaine-free urine samples achieved between 7 and 12 weeks of sustained cocaine abstinence; only one control patient (6%) achieved more than 2 weeks of sustained abstinence. Among patients receiving vouchers for cocaine-free urine samples, those who achieved sustained abstinence (> or = 5 weeks) had significantly lower concentrations of benzoylecgonine in baseline urine samples than those who did not achieve sustained abstinence (P < or = .01). Patients receiving voucher reinforcement rated the overall treatment quality significantly higher than controls (P = .002). Voucher-based reinforcement contingencies can produce sustained cocaine abstinence in injecting polydrug abusers. (Author abstract modified)

Tennant, F., & Shannon, J. (1995). Cocaine abuse in methadone maintenance patients is associated with low serum methadone concentrations. Journal of Addictive Diseases, 14, 67-74.

Cocaine abuse in methadone maintenance patients has emerged as a significant clinical problem. To determine if raising the daily methadone dosage is an effective way to eliminate cocaine abuse, 74 methadone maintenance patients maintained at daily dosages between 30 and 80 mg and who chronically abused cocaine were studied by a standard protocol. A total of 21 (28.4%) subjects ceased cocaine abuse when their methadone dosage was progressively raised to a maximal daily dose of 160 mg. Cocaine abuse appeared to accelerate elimination of methadone, since inadequate methadone serum concentrations (below 100 ng/ml) were found in 48 of 67 (71.6%) subjects tested 24 hours after a 100 mg oral methadone dose. Although cocaine abuse in methadone maintenance patients may respond to raising the daily methadone dosage, alternative treatments for cocaine abuse in methadone maintenance patients must be identified since cocaine abuse may lower serum methadone concentrations.

3.6 Pregnancy

Cejtin, H. E., Mills, A., & Swift, E. L. (1996). Effect of methadone on the biophysical profile. Journal of Reproductive Medicine, 41, 819-822.

To determine the effect of methadone on the biophysical profile, 16 narcotics-dependent gravidas on methadone maintenance were selected for the study. Biophysical profiles and non-stress tests (NSTs) were performed on women between 28 and 40 weeks' estimated gestational age before and 2 hours after methadone was given. The reactivity of the non-stress tests, biophysical profile scores and time needed to complete the biophysical profiled before and after methadone dosing were compared. Significantly more NSTs were nonreactive after methadone (P <.001), and it took more time for the NST to become reactive (P <.01). Although it took longer for the modified biophysical profile to be completed after methadone dosing, with the mean time going from 3.8 to 19.8 minutes (P <.01), the scores were the same before and after methadone in 75 percent of the women, with the mean score not significantly different before or after methadone. Our results suggest that the modified biophysical profile is a clinically useful test in the methadone-maintained gravida. (Author abstract modified)

DePetrillo, P. B., & Rice, J. M. (1995). Methadone dosing and pregnancy: Impact on program compliance. International Journal of the Addictions, 30, 207-217.

A retrospective, inception cohort, non-randomized control design was employed to evaluate the effects of daily vs. twice daily dosing of methadone on opiate/cocaine use, and noncompliance with urine toxicology requests in methadone-maintained pregnant women, N=45. Earlier program entry, i.e., in the first trimester, was associated with decreased opiate and cocaine use and increased compliance with urinalysis requests. This finding was attributed to the clinical benefits of a longer stay in treatment. The single dose and split-dose groups differed in Trimester III only both in urine toxicology compliance rates, with 23.8 vs. 0.5 percent non-compliant, respectively, as well as percentages of urine samples positive for cocaine, with 15.3 vs. 0.3 percent. The findings suggested increased opiate withdrawal effects, which occurred primarily in the third trimester of pregnancy. It was suggested by the authors that these effects, may be due to an increase in the rate which methadone is metabolized during pregnancy. It was further suggested that the resulting withdrawal effects of such rapid methadone clearance was alleviated in the split dosing condition. (See Swift et al., 1989, later in this section)

Finnegan, L. P., & Kandall, S. R. (1997). Maternal and neonatal effects of alcohol and drugs. In J. H. Lowinson, P. Ruiz, R. B. Millman, & J. G. Langrod (Eds.), Substance abuse: A comprehensive textbook (3rd ed., pp. 513-534). Baltimore, MD: Williams and Wilkins.

This chapter reviews current literature on the social and medical characteristics of pregnant drug-dependent women; discusses the effects of substance abuse on pregnant women, their fetus, and their newborns; and makes recommendations for management of both the mothers and their infants. Sections of the chapter are devoted to social and medical characteristics of pregnant drug-dependent women; normalizing the intrauterine milieu; methadone maintenance; impact of maternal narcotic use on fetal welfare; acute morbidity and mortality in infants born to narcotic-dependent women; neonatal narcotic abstinence syndrome (symptomatology, determinants and patterns of neonatal abstinence, behavioral studies in the neonatal period, assessment and management); later sequelae of intrauterine opiate exposure; long-term outcome of children exposed in utero to opiates, cocaine, amphetamines, and alcohol. The chapter concludes with recommendations for research and public policy.

Geraghty, B., Graham, E. A., Logan, B., & Weiss, E. L. (1997). Methadone levels in breast milk. Journal of Human Lactation, 13, 227-230.

Two case reports of breastfeeding mothers on high doses of methadone and a literature review reveal that minimal transmission of methadone into breast milk occurs regardless of the mother's methadone dose. The current American Academy of Pediatrics recommendations that only women in drug treatment programs on less than 20 mg/day of methadone be advised to breastfeed should be reconsidered.

Hagopian, G. S., Wolfe, H. M., Sokol, R. J., Ager, J. W., Wardell, J. N., & Cepeda, E. E. (1996). Neonatal outcome following methadone exposure in utero. Journal of Maternal and Fetal Medicine, 5, 348-354.

To examine the relationship between maternal methadone exposure and neonatal head circumference and abstinence syndrome, we examined the records of 172 opiate-addicted gravidas enrolled in a methadone maintenance program in an urban hospital over a 2-year period. Higher doses of methadone in the third trimester were associated with increased head circumference reflecting both increased gestational duration and improved overall growth. Neonatal withdrawal was positively correlated with race and gestational age at delivery, with non-black infants exhibiting higher neonatal abstinence scores than blacks following adjustment for maternal dose and gestational age at delivery. Selection of optimal methadone dosage is a complex problem in which the favorable neurobehavioral outcome associated with increased growth and gestational age must be weighed against the risks associated with more severe neonatal withdrawal. Our findings of improved overall fetal growth and gestational duration associated with higher methadone doses suggest that more liberal methadone dosing in pregnancy may improve long-term neonatal outcome.

Kandall, S. R. (Ed.). (1993). Improving treatment for drug-exposed infants (Treatment Improvement Protocol No. 5). Rockville, MD: Center for Substance Abuse Treatment.

The primary focus of this document is the in utero exposure of infants to illicit drugs (cocaine and opiates), as well as methadone exposure. This Treatment Improvement Protocol (TIP) also highlights medical and psychosocial services for drug-exposed infants up to 18 months of age and their families. Chapters cover medical management of the drug-exposed infant; follow-up and aftercare; psychosocial services for the drug-exposed infants and their families; and ethical, legal, and quality assurance guidelines.

Kandall, S. R., & Petrillo, J. (1996). Substance and shadow: Women and addiction in the United States. Cambridge, MA: Harvard University Press.

This book presents a historical overview of women and addiction in the United States and traces the variety of treatments and policies that have addressed these issues. Five themes of the book are identified: the significant portion of drug users and addicts who are women from a variety of racial, geographic, and socioeconomic backgrounds; the components of women's addiction problem, including not only self-medication, but also the inappropriate and often excessive medication of women by primarily male physicians and pharmacists; the role of women as childbearers and childrearers, particularly in terms of medicating children with dangerous drugs, as was the case in the 19th century with opiate-laden medications; the significance of sexuality and drug use, including issues of prostitution, drug-associated sex, and the triad of minority status, HIV-positive status, and children identified as "drug babies"; and the differences between acknowledging women's drug use over the last century and the specific issue of helping drug-addicted women, which was not directly confronted until the early 1970s. Chapters follow the history of the drug problem, covering the Harrison Anti-Narcotic Act of 1914, the classic era of drug enforcement from the 1920s through World War II, law enforcement drug policy and the acute narcotic problem from the beginning of World War II, trends in the 1960s and 1970s, recent treatment options (e.g., detoxification, therapeutic community, outpatient and inpatient programs, correctional programs, and methadone maintenance), and drug addiction and anti-drug policies in the 1980s. Each chapter addresses issues of prevalence, types of drugs abused (primarily narcotics), drug-related crime, government policies, and implications for women as mothers.

Rosen, T. S., & Johnson, H. L. (1993, November/December). Prenatal methadone maintenance: Its effects on fetus, neonate, and child. Developmental Brain Dysfunction, 317-323.

Methadone maintenance has been the treatment of choice for heroin addiction for the past several years. It blocks the craving and euphoric effects of heroin and can be administered once a day. Methadone maintenance during pregnancy is associated with better prenatal care and lifestyle, but the effects on neonate and child have been reported to be problematic. The mean gestational age and birth weight have been reported to be lower with a higher incidence of small for gestational age. A higher incidence of small head circumferences as compared with weight has also been reported which frequently persists into childhood. The incidence of abstinence symptoms varies between 70 and 90 percent with increased severity and duration and a higher incidence of late-occurring seizures. The incidence of sudden infant death syndrome has been reported to be increased in these infants. Follow-up studies during the first 2 years have reported from no abnormalities to problems with tone, coordination, hyperactivity, short-attention span, and developmental delays. Bayley Mental Developmental Index and Psychometer Developmental Index mean scores have been similar in both methadone and control children—however, with a disproportionate number of low scores in the methadone children. On further data analysis, maternal drug abuse functioning and family environmental conditions were important predictors of the child's neurodevelopmental outcome. In summary, children born to mothers on methadone maintenance with a suboptimal intrauterine environment are at high risk for neurodevelopmental problems when raised in a high-risk environment associated with the drug culture. However, these same infants, raised in an optimal nurturing and stable situation, have a good prognosis.

Swift, R. M., Dudley, M., DePetrillo, P., Camara, P., & Griffiths, W. (1989). Altered methadone pharmacokinetics in pregnancy: Implications for dosing. Journal of Substance Abuse, 4, 453-460.

Lower plasma methadone levels have been reported in pregnant women receiving methadone maintenance for heroin addiction. Methadone pharmacokinetics was examined in a 24-year-old woman 8 months pregnant with twins, who experienced severe withdrawal symptoms beginning 10-12 hours after her daily 30 mg methadone dose. Methadone plasma concentration-time data were fit to a one-compartment pharmacokinetic model by extended least-squares regression. Estimated half-life for methadone was 8.1 hours, which is much shorter than the usual methadone half-life (greater than 24 hours). Plasma methadone concentrations were estimated for the cases of increasing the 30 mg methadone dose by 50 percent and administering it once daily and continuing the 30 mg methadone dose but administering it at 12-hour intervals. Although the model is derived from a single subject, the simulations performed clearly suggest a need for altered methadone dosing in pregnancy. More sustained plasma methadone levels are achieved with twice-daily dosing of methadone than are achieved by administering an increased methadone dose once daily. Twice-daily dosing would be expected to produce fewer withdrawal symptoms and, ultimately, improved compliance with treatment.

4. EVALUATION

Alterman, A. I., Rutherford, M. J., Cacciola, J. S., McKay, J. R., & Boardman, C.R. (1998). Prediction of 7 months methadone maintenance treatment response by four measures of antisociality. Drug and Alcohol Dependence, 49, 217-223.

Zero-order correlational and simultaneous regression analyses were performed to ascertain the comparative validity of four measures of antisociality for predicting the initial 7 months treatment response of 193 male methadone maintenance (MM) patients. Predictor variables were the number of childhood conduct disorder (CD) behaviors, number of adult antisocial personality disorder (A-APD) behaviors, the revised psychopathy checklist (PCL-R) score and the revised California Psychological Inventory-Socialization (CPI-So) scale score. The outcome measures were completion/noncompletion of 7 months of treatment, percent positive during treatment of cocaine, opiate and benzodiazepine urine toxicologies, and change from baseline to 7 months follow-up in 7 Addiction Severity Index (ASI) composite scores (CSs). All four measures of antisociality were significantly correlated with treatment noncompletion, although only the PCL-R score was significant in the predictor model. The PCL-R predicted more positive cocaine urine samples. At the individual level, both PCL-R and CPI-So were associated with more positive benzodiazepine urine samples, but neither contributed a significant amount of variance when both were entered in the model. None of the predictors were significantly associated with self-reported improvement in the CSs. The PCL-R and CPI-So were more successful in predicting outcomes than the two behavior-based measures.

Ball, J. C. (1990). A schema for evaluating methadone maintenance programs. In L. S. Harris (Ed.), Problems of drug dependence, 1989 (NIDA Research Monograph No. 95, pp. 74-76). Rockville, MD: National Institute on Drug Abuse.

An evaluation schema is presented which includes four domains of data collection: the patients; the treatment domain; services provided; and program outcome. The first domain consists of patient data. The second domain in the schema is the treatment domain. The third domain in the evaluation schema encompasses the actual provision of treatment and rehabilitative services. The fourth domain of the schema is patient and program outcome following treatment.

Ball, J. C., & Corty, E. (1988). Basic issues pertaining to the effectiveness of methadone maintenance treatment. In C. G. Leukefeld & F. M. Tims (Eds.), Compulsory treatment of drug abuse: Research and clinical practice (NIDA Research Monograph No. 86, pp. 178-191). Rockville, MD: National Institute on Drug Abuse.

The problem of heroin addiction in the United States was discussed from a historical and sociological perspective, with emphasis on recent influences that have awakened concern about its scope and consequences. The role of methadone maintenance treatment in addressing the problem of heroin addiction in the United States was considered. It was concluded that methadone maintenance can be effective, especially with respect to reducing illicit drug use and crime.

Bell, J., Mattick, R., Hay, A., Chan, J., & Hall, W. (1997). Methadone maintenance and drug-related crime. Journal of Substance Abuse, 23, 15-25.

Using data from an evaluation of methadone maintenance treatment, this study investigated factors associated with continued involvement in crime during treatment, and in particular whether there appeared to be differences in effectiveness of treatment between different methadone clinics. The methodology was an observational study, in which 304 patients attending three low-intervention, private methadone clinics in Sydney, Australia, were interviewed on three occasions over a 12-month period. Outcome measures were self-reported criminal activity and police department records of convictions. By self-report, crime dropped promptly and substantially upon entry to treatment, to a level of acquisitive crime about one-eighth of that reported during the last addiction period. Analysis of official records indicated that rates of acquisitive convictions were significantly lower in the in-treatment period compared to the prior-to-entry-into-treatment period, corroborating the changes suggested by self-report. Persisting involvement in crime while in treatment was predicted by two factors: the cost of persisting use of illicit drugs, particularly cannabis, and ASPD symptom count. Treatment factors also were independently predictive of continued involvement in crime. By both self-report and official records, and adjusting for subject factors, treatment at one clinic was associated with greater involvement in crime. This clinic operated in a chaotic and poorly organized way. It is concluded that crime during methadone treatment is substantially lower than during street addiction, although the extent of reduction depends on the quality of treatment being delivered.

Ball, J. C., & Ross, A. (1991). The effectiveness of methadone maintenance treatment: Patients, programs, services, and outcome. New York: Springer-Verlag.

Patients in methadone maintenance treatment, N=600. How effective is methadone maintenance treatment? Initial and follow-up interview data collected from N=506 Patients from 6 programs in New York, Philadelphia and Baltimore. N=399 patients still in treatment at follow-up and N=107 dropouts were interviewed. Instruments were ASI plus supplementary questions about crime and IV drug use. Program level data were also collected including 1) a facility survey, 2) operations data 3) staff interviews, 4) urinalysis records, 5) services data. Five outcomes were assessed: Past 30 day use of -heroin, cocaine, any opiates or cocaine, recency of IV drug use, and days with criminal activity in past 30. Patient, program and process variables were each associated with one or more outcomes. Two program components were each associated with all outcomes. The first, COUNS-DIR-POL, represents counseling service, an effective director, and a maintenance orientation and the second, MED represents the adequacy of medical services.

Calsyn, D. A., Wells, E. A., Saxon, A. J., Jackson, T. R., & Stanton, V. V. (1996). Outcome of a second episode of methadone maintenance. Drug and Alcohol Dependence, 43, 163-168.

The treatment progress of 353 methadone maintenance clients who withdrew from treatment or who were discharged from treatment, and who later were readmitted to specific treatment programs and assigned to the same contingency condition as in their initial treatment episode was studied. Thirty-nine clients in a contingency contract condition remained in treatment for 6 months during both the initial and a second treatment episode, which was long enough to be exposed to discharge sanctions that were part of the contingency contract. Of these, 34 clients failed treatment during the initial treatment episode, and nine of these initial treatment failures improved their performance in the second episode of treatment. Of the five subjects who were initially successful in treatment but left for non-contract reasons, only one failed in the second treatment episode. Seventeen clients were in a treatment condition for which no contingencies for positive urine samples was applied. Of these, 14 failed during their initial treatment episode; three of these improved their performance in the second round of treatment. However, two of the three who were successful during the initial treatment episode failed in the second round of treatment. These results show that the effects of contingency contracting may need to be evaluated over the course of more than one treatment episode in order to demonstrate improved performance.

Dennis, M. L., Ingram, P. W., Burks, M. E., & Rachal, J. V. (1994). Effectiveness of streamlined admissions to methadone treatment: A simplified time-series analysis. Journal of Psychoactive Drugs, 26, 207-216.

Increasing the availability and streamlining the admissions to methadone treatment have been the focus of national plans to address the spread of the acquired immune deficiency syndrome (AIDS). This article uses simplified time-series analysis to evaluate one of the first methadone treatment waiting list reduction demonstration grants. The demonstration grant significantly increased both the number of people requesting intake appointments from 35 to 100 per month and the percentage of kept appointments from 33 percent to 54 percent. An additional 100 slots were filled in fewer than 3 months and resulted in a net increase in the length of the waiting list. Relative to the preceding 2 years, new clients during the grant period were significantly more likely to be 40 or older, African American, unemployed, daily opioid users, daily cocaine users, and dependent on public assistance to finance treatment. Controlling for the source of treatment financing (a case-mix adjustment), there were no significant changes in retention rates. The program's static client capacity rose from 310 prior to the grant to a peak of 449 during the grant, with a leveling of 410 after the grant. Given that it is clearly more humane and less expensive to treat people who desire treatment, rather than wait for them to commit a crime and be arrested, this study suggests the need to make more treatment available on demand. (Author abstract modified)

Hubbard , Marsden, M. E., Rachal, J. V., Harwood, H. J., Cavanaugh, E. R., & Ginzburg, H. M. (1989). Clients in the major modalities. In R. L. Hubbard, M. E. Marsden, J. V. Rachal, H. J. Harwood, E. R. Cavanaugh, & H. M. Ginzburg (Eds.), Drug abuse treatment: National study of effectiveness (pp. 71-98). Chapel Hill: University of North Carolina Press.

Follow-up interviews with N=1,539 former methadone treatment, clients in the Treatment Outcomes Perspective Study (TOPS) 1979-'81 Cohort. *[Note: Other treatment modalities were included in the study but only the OMT modality is reviewed here.]* The purpose of the study was to determine: how effective is drug abuse treatment in reducing drug use and restoring people's lives? Data were assessed over a five year period. Decreases in daily or weekly (regular) use found of heroin, cocaine, marijuana, and psychotherapeutic drugs were fouind for the three modalities between the pre-intake and each follow-up period i.e. 3 months in treatment, 3-month follow-up, 1-year follow-up, 2 year follow-up and 3 to 5-year follow-up. Longer stays in treatment were associated with reduced drug use but not other behaviors. For clients treated for 3+ months, consistent pre-treatment to post treatment reductions were found for intravenous drug use and criminal activities. Changes in employment were relatively small and inconsistent across time periods. A logistic regression analysis (LR) was completed for N=835 methadone treatment clients. Long term maintenance clients had a 5 times lower odds of regular heroin use than clients with less than 1 week of treatment, a 2 times lower odds of heavy alcohol use and 3 times lower odds of involvement in predatory illegal acts.

Hubbard, R.L., Craddock, S.G., Flynn, P.M., Anderson, J. and Etheridge, R.M. (1997) Overview of 1-year follow-up outcomes in the Drug Abuse Treatment Outcome Study (DATOS). Psychology of Addictive Behaviors, 11, 261-278.

The Drug Abuse Treatment Outcome Perspective Study (DATOS), N=1,203 OMT patients in Pre-admission year and N=727 in follow-up year. *Note: Other treatment modalities were included in the study but only the OMT modality is reviewed here.* What are the 1-year follow-up and pre-admission differences in drug use and behaviors? Are drug use and other behaviors in the follow-up year associated with duration of treatment? Reductions at 1 year follow-up were found in weekly heroin and cocaine use. No difference was found between groups retained for different durations in the percentage reductions of drug and alcohol use. Using logistic regression, *the still in treatment,> 6 months (* in treatment*)* and *3-6 months* were compared to the *< than 3 months* group. The *still in treatment* group had a lower odds of weekly heroin (.24, p<.05) and marijuana use (.49, p<.05). The *>6 month*s group had lower odds of marijuana (.44, p<.05) and the 3-6 months group had a higher odds of heavy alcohol use (2.73, p<.05) and predatory illegal activity (3.11, p<.05).

Kraft, M. K., Rothbard, A. B., Hadley, T. R., McLellan, A. T., & Asch, D. A. (1997). Are supplementary services provided during methadone maintenance really cost-effective? American Journal of Psychiatry, 154, 1214-1219.

Previous research has suggested that support services supplementing methadone maintenance programs vary in their cost-effectiveness. This study examined the cost-effectiveness of varying levels of supplementary support services to determine whether the relative cost-effectiveness of alternative levels of support is sustained over time. A group of 100 methadone-maintained opiate users were randomly assigned to three treatment groups receiving different levels of support services during a 24-week clinical trial. One group received methadone treatment with a minimum of counseling, the second received methadone plus more intensive counseling, and the third received methadone plus enhanced counseling, medical, and psychosocial services. The results at the end of the trial period have been published elsewhere. This article reports the results of an analysis at a 6-month follow-up. The follow-up analysis reaffirmed the preliminary findings that the methadone plus counseling level provided the most cost-effective implementation of the treatment program. At 12 months, the annual cost per abstinent client was $16,485 for the low levels, $9,804 for the intermediate levels, and $11,818 for the high levels of support. Abstinence rates were highest, but modestly so, for the group receiving the high-intensity, high-cost methadone with enhanced services intervention. This study suggests that large amounts of support to methadone-maintained clients are not cost-effective, but it also demonstrates that moderate amounts of support are better than minimal amounts. As funding for these programs is reduced, these findings suggest a floor below which supplementary support should not fall. (Author abstract modified)

Maddux, J. F., Prihoda, T. J., Vogtsberger, K. N. (1997). The relationship of methadone dose and other variables to outcomes of methadone maintenance. American Journal of the Addictions, 6, 246-255.

The authors evaluated the relationship of methadone dose to retention in treatment and to urine tests for morphine and cocaine in a cohort of 610 opioid users admitted to methadone maintenance and followed for 1 year. Methadone dosing was flexible, with patient participation in dose decisions. The maximum dose during treatment ranged from 10 mg to 110 mg, with a mean of 52 mg. Higher doses were associated with increased retention through the dose range of 60 mg-69 mg. Dose was not related to the likelihood of a positive morphine test but was related to the likelihood of a positive cocaine test. In this study, with flexible dosing and patient participation in dose decisions, patients were retained on methadone about as well as was reported in a previous study with patients on a fixed dose of 80 mg.

Margolin, A., Avants, S. K., Rounsaville, B., Kosten, T. R., Schottenfeld, R. S. (1997). Motivational factors in cocaine pharmacotherapy trials with methadone-maintained patients: Problems and paradoxes. Journal of Psychoactive Drugs, 29, 205-212.

Pharmacotherapy trials for cocaine abuse among methadone-maintained patients have typically reported negative findings as well as high rates of cocaine use during the trial. The contribution of motivational factors to these results is a potentially important, under investigated area. This article points out that some methadone-maintained patients may enter a trial for cocaine abuse with little desire for treatment, motivated primarily to continue receiving methadone or to avoid program sanctions for continued cocaine use. Participants in clinical trials may constitute a phase delaying discharge in a cyclic pattern of multiple treatment episodes. Testing a pharmacologic agent in a motivationally inappropriate sample may not provide a good estimate of the agent's effectiveness. In view of the important public health role that methadone maintenance programs play in preventing HIV transmission, and the subversion of this role by intravenous cocaine use, solutions to these problems are urgently needed. The authors suggest several possible approaches, including pre- and post-treatment motivation assessment, as well as the inclusion of psychosocial interventions that provide the context for the emergence of potential medication effects.

Meek, P. S., Piotrowski, N. A., Tusel, D. J., Henke, C. J., Hartz, D. T. et al. (1995). Cost-effectiveness of contingency contracting with opioid addicts in methadone treatment. In L. S. Harris (Ed.), Problems of drug dependence, 1995: Proceedings of the 57th annual scientific meeting, College on Problems of Drug Dependence (NIDA Research Monograph No. 162 , p. 161). Scottsdale, AZ.

A 6-month methadone detoxification program compared the effectiveness of intensive psychosocial treatment with contingency contracting for drug-free urine samples to a similar treatment regimen without contingency contracting for drug-free urine samples. Opioid addicts could obtain rewards during the first 120 days of treatment by proving their urine samples were completely free from all drugs. Due in large part to the substantial number of subjects in the contingency condition earning minimal or no rewards, the two groups did not differ in average per-subject cost. Over the 120-day period, subjects in the contingency group produced an average of 26 percent drug-free urine specimens, while the non-contingency group produced 17 percent drug-free urine specimens. Cost-effectiveness analyses showed that each percentage point improvement in outcome could be obtained by an average incremental treatment cost of $22. An average incremental treatment cost of $146 per contingency subject was associated with an additional 10 percent of the subjects providing completely clean urine samples during the last month of treatment.

Novick, D. M. & Joseph, H. (1991). Medical maintenance: The treatment of chronic opiate dependence in general medical practice. Journal of Substance Abuse Treatment, 8, 233-239.

Medical maintenance was created to treat rehabilitated methadone maintenance patients within the context of general medical practice. One hundred methadone patients who met screening criteria were transferred for continuing care from traditional methadone clinics either to the practices of hospital-based physicians or to a health maintenance organization. Patients see their physicians about once per month, submit urine samples at the time of the office visits, drink a dose of methadone in the presence of their doctor or nurse, and receive a 28-day supply of methadone in pill or tablet form. The methadone prescriptions are filled by the hospital pharmacies. Physicians are responsible for the patients' annual physicals and can treat patients for other conditions. In our initial analysis of medical maintenance, 82.5 percent of the patients remained in good standing and 5 percent left the program voluntarily in good standing; the remaining 12.5 percent who were unable to respond favorably were returned to clinic programs. For rehabilitated patients requiring long-term or life-long care, medical maintenance is a viable alternative to traditional clinic programs. With proper policies and procedures, medical maintenance can be implemented in many hospitals.

Novick, D. M., Joseph, H., Salsitz, E. A., Kalin, M. F., Keefe, J. B., Miller, E. L., & Richman, B. L. (1994). Outcomes of treatment of socially rehabilitated methadone maintenance patients in physicians' offices (medical maintenance): Follow-up at 3 ½ to 9 ¼ years. Journal of General Intern Medicine, 9(3), 127-130.

This study determined whether selected socially rehabilitated former heroin addicts maintained on methadone can continue successful rehabilitation while maintained on methadone by primary care physicians rather than licensed clinics. This procedure has been termed "medical maintenance." Cohort study with 42-111 months of follow-up. Offices of hospital staff physicians (internists or family practitioners). The 100 patients met extensive entry criteria, including 5 or more years in conventional methadone maintenance treatment; stable employment or other productive activity; verifiable financial support; and no criminal involvement, use of illegal drugs, or excessive alcohol use within 3 or more years. Outcome measures used were retention in treatment, discharge for one of several reasons, lost medication incidents, and substance abuse. At 1, 2, and 3 years of treatment, 98, 95, and 85 patients, respectively, remained in medical maintenance. Cumulative proportional survival in treatment was 0.735 ± 0.048 at 5 years and 0.562 ± 0.084 at 9 years. After 42-111 months, 72 patients remained in good standing; 15 patients had unfavorable discharges (11 for cocaine use, three for misuse of medication, and one for administrative violations); 7 voluntarily withdrew from methadone in good standing (after receiving it for 9.1-24.4 years); 4 died; 1 transferred to a chronic care facility; and 1 voluntarily left the program. Carefully selected methadone maintenance patients in medical maintenance have a high retention rate and a low incidence of substance abuse and lost medication. Voluntary withdrawal from methadone maintenance after 1 or 2 decades is possible.

The authors believe that medical maintenance should be made available to appropriate patients in other localities. (Author abstract modified)

Novick, D. M., Richman, B. L., Friedman, J. M., Friedman, J. E., Fried, C., Wilson, J. P., Townley, A., & Kreek, M. J. (1993). The medical status of methadone maintenance patients in treatment for 11-18 years. Drug and Alcohol Dependency, 33, 235-245.

To assess the safety and potential health consequences of long-term methadone maintenance treatment, the authors identified 111 male patients admitted to methadone maintenance treatment between 1965 and 1968, still enrolled in 1980 and in continuous treatment for at least 10 years. Between 1980 and 1985, the authors examined patients or reviewed records of 110 patients (99%). Most medical diagnoses, symptomatic complaints, physical examination findings and laboratory test results occurred with similar frequency in the long-term methadone maintenance patients and in a group of 56 long-term heroin addicts. These data suggest that prolonged methadone maintenance treatment is safe and is not associated with unexpected adverse effects. (Author abstract modified)

Reilly, P. M., Sees, K. L., Shopshire, M. S., Hall, S. M., Delucchi, K. L., Tusel, D. J., Banys, P., Clark, H. W., & Piotrowski, N. A. (1995). Self-efficacy and illicit opioid use in a 180-day methadone detoxification treatment. Journal of Consulting and Clinical Psychology, 23, 158-162.

Self-efficacy ratings coincided with illicit opioid use across the 3 phases of a 180-day methadone detoxification treatment. Efficacy ratings increased after patients received their first dose of methadone, did not change while they were maintained on a stable dose of methadone, and declined during the taper as they attempted to face high-risk situations without the full benefit of methadone. Efficacy ratings measured at a point before a phase of treatment predicted illicit opioid use across that phase. For clarification of the relation between self-efficacy and illicit opioid use, 3 conceptual models proposed by J. S. Baer, C. S. Holt, and E. Lichtenstein (1986) were tested. Self-efficacy influenced subsequent drug use in parallel with previous behavior, but this influence was found only at the start of the stabilization phase and immediately before the start of the taper phase. These findings highlight the usefulness of the self-efficacy concept for the treatment of opioid addiction.

Silverman, K., Wong, C. J., Higgins, S. T., Brooner, R. K., Montoya, I. D., Contoreggi, C., et al. (1996). Increasing opiate abstinence through voucher-based reinforcement therapy. Drug and Alcohol Dependency, 23, 157-165.

Heroin dependence remains a serious and costly public health problem, even in patients receiving methadone maintenance treatment. This study used a within-subject reversal design to assess the effectiveness of voucher-based abstinence reinforcement in reducing opiate use in patients receiving methadone maintenance treatment in an inner-city program. Throughout the study, subjects received standard methadone maintenance treatment involving methadone, counseling, and urine monitoring (three times per week). Thirteen patients who continued to use opiates regularly during a 5-week baseline period were exposed to a 12-week program in which they received a voucher for each opiate-free urine sample provided: the vouchers had monetary values that increased as the number of consecutive opiate-free urine samples increased. Subjects continued receiving standard methadone maintenance for 8 weeks after discontinuation of the voucher program (return-to-baseline). Tukey's posthoc contrasts showed that the percentage of urine specimens that were positive for opiates decreased significantly when the voucher program was instituted ($P <$ or $= 0.01$) and then increased significantly when the voucher program was discontinued during the return-to-baseline condition ($P <$ or $= 0.01$). Rates of opiate positive urine samples in the return-to-baseline condition remained significantly below the rates observed in the initial baseline period ($P <$ or $= 0.01$). Overall, the study shows that voucher-based reinforcement contingencies can decrease opiate use in heroin-dependent patients receiving methadone maintenance treatment.

Simpson, D.D., Sells, S.B., (1990) Opioid Addiction and Treatment: A 12-year Follow-up. Malabar, FL: Kreiger.

12-Year post-treatment follow-up interviews were conducted with N=490 opiod addicts in substance abuse treatment from 1969-1972 under Drug Abuse Reporting Program (DARP). *[Note: Other treatment modalities were included in the study but only the OMT modality is reviewed here.]* The major research question was what are the long term patterns of drug use and non-use following substance abuse treatment? Daily opioid use declined from 100 percent pre-DARP to 26 percent in year 12 post-DARP. Any opiod use declined from 100 percent pre- to a low of 38 percent in year 12 post-DARP. Marijuana and alcohol use increased over the same period; Any employment increased from 64 percent pre- to 70 percent in year 12 post-DARP. Any arrests declined from 83 percent pre- to 12 percent year 12 post-DARP. Any jail or prison declined from 67 percent pre- to 26 percent in year 12 post-DARP. By year 12 post-DARP 74 percent had relapsed one or more times. Relapse was most likely in first 3 months post- DARP.

Svikis, D. S., Lee, J. H., Haug, N. A., & Stitzer, M. L. (1997). Attendance incentives for outpatient treatment: Effects in methadone- and nonmethadone-maintained pregnant drug dependent women. Drug and Alcohol Dependence, 48, 33-41.

The effectiveness of behavioral incentives for improving treatment participation and retention in samples of methadone-maintained (N = 66) and nonmethadone-maintained (N = 76) pregnant, drug-dependent women was examined. Subjects were randomly assigned to receive $0 (standard care), $1, $5, or $10/day for attending at least 4 hours of interdisciplinary treatment programming during the first 7 consecutive days after a transfer from residential to outpatient care, with payment dispensed in the form of gift certificates. Methadone-maintained women attended nearly twice as many full treatment days as those not receiving methadone (5.2 vs. 2.8

days; $P < 0.001$) and were retained in treatment significantly longer (86.4 vs. 28.9 percent active in treatment at 30 days). There was no main effect of incentives and no effect on attendance in methadone patients. However, nonmethadone patients offered higher magnitude incentives ($5/$10) attended 3.3 days out of 7 on average, compared to 2.3 days for those offered $0 or $1 per day ($t = 1.73$; $P < 0.05$). The study confirmed that methadone maintenance is a powerful therapeutic adjunct, which is associated with significantly better treatment retention and participation in ancillary programming than is abstinence-based treatment. It was also found that modest financial incentives can facilitate treatment participation for abstinence-based patients. However, more potent interventions would be needed to match the effectiveness of methadone in this regard.

Torrens, M., Castillo, C., & Perez-Sola, V. (1996). Retention in a low-threshold methadone maintenance program. Drug and Alcohol Dependency, 23, 55-59.

In 370 opioid-dependent patients included consecutively in a low-threshold methadone maintenance program, the effect of different variables on the retention rate was assessed. The variables included the patients' age, sex, family situation, employment status, length of heroin use, current route of drug consumption, previous treatments, current consumption of cocaine, alcohol and benzodiazepines, needle sharing, HIV serostatus, and methadone dose. The retention rate after 2 years of methadone maintenance was 72 percent. Dosage of methadone less than 80mg/day, less than 30 years of age, living with family or stable partner and non-current use of alcohol were significant predictive variables for retention.

OTHER RESOURCES

Addiction Treatment Forum
1750 E. Golf Rd., Ste. 320
Schaumburg, IL 60173
Fax: (847) 413-0526
URL: http://www.atforum.com/index.html

This site provides conference listings, previous "issues," and questions on methadone dosage.

Advocates for the Betterment of Addiction Treatment and Education (ABATE)
URL: http://www.nordexent.com/abate/

ABATE's Web pages link to treatment legislation and related sites of interest.

American Methadone Treatment Association
217 Broadway, Ste. 304
New York, NY 10007
(212) 566-5555
Fax: (212) 349-2944
URL: http://www.assnmethworks.org

AMTA's Web site currently provides a calendar of events, including conferences, as well as their mission statement and description of their activities.

Center for Substance Abuse Research (CESAR)
URL: http://www.bsos.umd.edu/cesar/cesar.html

The information at this site is mostly geared to Marylanders; however, the Web site hosts selected NEDTAC "databases," links to related resources, and a wealth of information dealing with substance abuse treatment from different perspectives, such as criminal justice and legislation.

Center for Substance Abuse Treatment (CSAT)
URL: http://www.samhsa.gov/csat/csat.htm

This site provides links to full-text documents, funding opportunities, and related links.

Chemical Dependency Research Working Group
NY State Office of Alcoholism and Substance Abuse Services
55 W. 125th St.
New York, NY 10027
(212) 961-8489
Contact: Herman Joseph
URL: http://www.users.interport.net/~nama/cdrwghom.htm

The Chemical Dependency Research Working Group is a project of the New York State Office of Alcoholism and Substance Abuse Services. The site provides links and online publications related to methadone.

Code of Federal Regulations
URL: http://www.access.gpo.gov/nara/cfr/cfr-table-search.html

CFR regulations may be searched by key words.

Methadone Information Exchange
URL: http://www.mindspring.com/~methinfex/

While geared to methadone patients (affiliated with the National Alliance of Methadone Advocates), the site provides news releases and easy-to-read information pertaining to methadone advocacy.

Methadone List

Subscribe: listproc@calyx.net; leave the subject line blank and in the body of the message, type: Subscribe methadone *your name*

National Alliance of Methadone Advocates (NAMA)
URL: http://www.methadone.org/

NAMA, an organization for quality methadone maintenance treatment, provides links to publications, press releases, and other related agencies.

National Evaluation Data Services (NEDS)
URL: http://neds.calib.com

National Institute on Drug Abuse (NIDA)
URL: http://www.nida.nih.gov/

This site serves as a jumping-off point for publications (catalog and full-text), conference information, and library of manuals, research reports, and informational fact sheets.

Project Cork Institute database
URL: http://www.dartmouth.edu/dms/cork/database.html

This database contains references on alcoholism and substance abuse. Type "select file cork" after connecting to the database via telnet.

Sample Drug Interaction Websites
Healthtouch URL: http://www.healthtouch.com/
RxList URL: http://www.rxlist.com/search/wwwwais/wwwwais.cgi

The sites allow searching drug names, side effects, and drug interactions.

Substance Abuse and Mental Health Services Administration (SAMHSA)
URL: http://www.samhsa.gov/

This site provides links to the three Centers, searchable databases, funding opportunities, and related links, such as KEN and NCADI (PrevLine).

Travel Regulations for Methadone Patients (INDRO)
Brewer Platz 18-20
48145 Münster
GERMANY
49 251-60123 or 234577
Email: ralf.gerlach@muenster.net
Contact: Ralf Gerlach
URL: http://home.muenster.net/~indro/travel.htm

This site provides an on-line worldwide travel guide for methadone patients.

Treatment Improvement Exchange
URL: http://www.treatment.org/opioid.html

This site serves as a jumping-off point for agencies, further reading, and other links related to LAAM and methadone.